A Taxonomy for Learning, Teaching and Assessing:

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A Revision of Bloom's Taxonomy of Educational Objectives
(L. Anderson & D. Krathwohl, eds.)

A Taxonomy for Learning, Teaching and Assessing: A Revision of Bloom's Taxonomy of Educational Objectives edited by Lori Anderson and David Krathwohl, is a work that attempts to refocus educators' attention on Bloom's Taxonomy while incorporating new knowledge and thought into the original Handbook. (Preface, xxii). For individuals unfamiliar with the original, Bloom's Taxonomy is a framework for categorizing educational objectives that was first published in 1956 by B.S. Bloom (editor), M.D. Englehart, E.J. Furst, W.H. Hill, and D.R. Krathwohl as The Taxonomy of Educational Objectives, The classification of Educational Goals, Handbook I: Cognitive Domain. The original handbook has been translated into many languages and has served as the basis for test design and curriculum development throughout the world (Preface, xxi). The current revision of the handbook includes one of the original authors, D.R. Krathwohl and an elite team of cognitive psychologists, curriculum theorists and assessment specialists. The preface of the revision explains with interesting detail the conditions leading to the creation of the revised handbook. Also included is a summary of changes (Appendix A) and a condensed version of the original handbook (Appendix B).

The main audience of the revised handbook is classroom teachers with instructional designers, web site designers, material designers and higher education faculty also serving as targeted audiences. For the non-classroom reader the major drawback of the text is that all of the examples provided are from classroom situations. However, the homogeneous nature of the examples should not hinder comprehension or understanding. A valuable feature of the revised handbook is the introduction of four organizational questions which are presented in Table 1.

Organizing Questions- Page 61.

1.What is important for students to learn in the limited school and class-room time available? (the learning question)

2.How does one plan and deliver instruction that will result in high levels of learning for large numbers of students? (the instruction question)

3.How does one design assessment instruments and procedures that provide accurate information about how well students are learning? (the assessment question)

4.How does one ensure that objectives, instruction, and assessment are consistent with one another? (the alignment question)

The organizational questions form the basis of text development by establishing a focus on essential elements of the educational process; learning, instruction, assessment and alignment. As the authors continually refer to the organizing questions when presenting new information, the reader is provided with a systematic method for considering the intent of the work which culminates in the Taxonomy Table, shown in Table II.

Structured as a handbook, the text allows readers to progress at their own pace reviewing information that is unclear and skimming where appropriate. Furthermore, the organizing questions establish a basis for the introduction of the Types of Knowledge to the Taxonomy Table, and for the revisions that were completed to the Cognitive Process Dimension of the original taxonomy. The text is comprised of three sections. Section I and Section III provide valuable learning opportunities while, Section II presents itself as a major development in education and training.

Section I of the text discusses educational objectives and student learning. Of relevance here is the authors' discussion of the difference between instructional content and instructional materials and the validity of using educational objectives in designing instruction. The authors' explanation of the relationship between global, educational and instructional objectives is clear and concise, and should prove to assist the novice writer of objectives in gaining skill. Section I is a must read for individuals with little or no experience with the original taxonomy. The authors do an excellent job presenting the pre-

requisite knowledge necessary to undertake the advanced learning presented in Section II. Section III of the text introduces six vignettes of the taxonomy in use in various classroom settings and provides a discussion of the use of the taxonomy table in evaluating each unit. Section III is a valuable tool for individuals with educational and instructional experience to check for understanding. For individuals with little or no experience with the original taxonomy, both the presentation of the instructional units and the analysis provided by the authors is a valuable learning tool that demonstrates the skill of the revision team in designing effective, appropriate learning situations.

Section II of the text is where the revised taxonomy table is introduced and is the part of the handbook that has universal appeal. In Section II the authors provide a clear explanation of how to use the table, and define both the Knowledge Dimension and the Cognitive Process Dimension. Of special importance to educators and materials designers across the spectrum of education and training, is the authors' clarification of the revisions of the six cognitive processes and the introduction of the nineteen subcategories. The revisions to the Cognitive Process Dimension provide an opportunity for educators to clearly define anticipated learning outcomes rather than use the collection of vague verbs usually associated with Bloom's Taxonomy. By utilizing a matrix to examine the relationships between types of knowledge and cognitive processes, the Taxonomy Table (Table II) allows the user to complete an efficient, visual analysis of the alignment between educational objectives, instructional methods and both formative and summative assessments. Whether the user is a teacher, designer or consultant, the Taxonomy Table will benefit both internal and external evaluation. Furthermore, the modifications to the Cognitive Process Dimension and the inclusion of the Knowledge Dimension in the Taxonomy Table provide a clear and efficient framework for the development of educational objectives, for curriculum prioritization and for the utilization of appropriate instructional methods.

Table II. The Taxonomy Table

The Knowledge Dimension	The Cognitive Process Dimension					
	1. Remember	2. Understand	3. Apply	4. Analyze	5. Evaluate	6. Create
A. Factual Knowledge						
B. Conceptual Knowledge						
C. Procedural Knowledge						
D. Meta-Cognitive Knowledge						

Educational Objectives

Throughout the text, the authors explain the importance of educational objectives in constructing instructional units and make clear how the revised taxonomy table will assist the user in classifying educational objectives. As shown in Table II, The taxonomy table itself consists of rows and columns that represent the intersection of the knowledge and the cognitive process dimensions. Given that all educational objectives either implicitly or explicitly have included the knowledge and cognitive process dimension, it should be possible to place an objective on the taxonomy table (p. 27). The ability to classify objectives on the taxonomy table should allow the user to reflect on the goals of instruction and on the alignment of educational objectives with instructional strategies and assessments. The authors stress the importance of the reflective and thoughtful discussions about educational objectives that can be created through the use of the Taxonomy Table. Multiple examples are presented throughout the text, especially in the vignettes, of the plausibility of different individuals classifying objectives in diverse ways. The goal, reasoning from the explanations provided in the text, is for the user to develop an internal barometer for evaluation that promotes the alignment of educational objectives with instructional methods and formative and summative assessments.

Curriculum Prioritization,

As noted in the first organizational question, a universal issue for all educators is how to best utilize instructional time. The Taxonomy Table lends itself well to curriculum prioritization. For educators who use the Taxonomy Table to complete an item analysis of summative assessments, a clear picture of the areas stressed by test makers will become evident. Comparing the item analysis of summative assessments to the analysis of educational objectives suggested above will clearly identify areas of strength and weakness in terms of curriculum development. Important to mention here is that the Revised Handbook focuses on cognitive objectives, or objectives that can be measured and planned for. The authors recognize the value of expressive outcomes, or learning that cannot be prepared for or planned (p.21). A point to consider is that with a clear picture of what is being assessed, educators will have more time to focus on the expressive outcomes that often form the basis of their individual goals, especially in classroom situations.

Instructional Methods

A major modification of the Original Handbook is the clarity established by the introduction of 19 specific cognitive processes that are defined with specific verbs to be used for each. Having clearly defined terminology eliminates the major flaw of the original taxonomy which was often accompanied by vague verbs with little clarity on the expected learning outcome. Having specific terms allows educators to identify instructional methods that are appropriate for each cognitive process. For example in the Understand Dimension, an educator can choose between seven specific cognitive processes. Two of the processes, Interpret and Classify will have varied instructional strategies that can be used to assist students in meeting the educational objective. For instructors, the utilization of the appropriate instructional strategy for the intended cognitive skill desired cannot be stressed enough. Much research has been conducted on instructional strategies and their impact on learning. Future research on instructional strategies will benefit from including the revised taxonomy table as a factor in the research. By identifying instructional strategies that correlate well with each of the cognitive process categories, the science of education and student learning will be advanced.

Summary

A Taxonomy for Learning, Teaching and Assessing: A Revision of Bloom's Taxonomy of Educational Objectives provides classroom teachers, instructional designers and material developers with a systematic framework for designing and developing cognitively appropriate educational objectives, for identifying and integrating valid instructional methods and for creating and/or utilizing the correct formative and summative assessments. The major benefit of the text is the creation of the Taxonomy Table, specifically the clarification of learner outcomes provided through the nineteen sub-categories of the cognitive process dimension. Research studies should be completed that examine if the utilization of the revised Taxonomy Table in instructional design and development result in quantifiable improvements in student learning. Studies should include the identification of specific instructional strategies for each of the nineteen sub-categories of the cognitive process dimension. Furthermore, the text should be used in the training of pre-service classroom teachers, instructional designers and materials developers to determine if the revised taxonomy table can produce quantifiable improvements in instructor preparation. Speaking to this point, anecdotal evidence from both pre-service and in-service teachers suggests that a more clear understanding of the educational process was gained after a systematic study of the text. Based on the attitudes and perceptions of in-service educators who have used the text, staff development programs and workshops should be established for individuals with experience in the design and development of instruction to benefit from the text.