TAXONOMY
OF
EDUCATIONAL OBJECTIVES

The Classification of Educational Goals

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HANDBOOK 1 COGNITIVE DOMAIN

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TAXONOMY OF EDUCATIONAL OBJECTIVES

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To Ralph W. Tyler,
whose ideas on evaluation have been
a constant source of stimulation to
his colleagues in examining, and whose
energy and patience have never failed us.

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PART I

INTRODUCTION
AND
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FOREWORD

Taxonomy--"Classification, esp. of animals and plants according to their natural relationships ..."[1]

Most readers will have heard of the biological taxonomies which permit classification into such categories as phyllum, class, order, family, genus, species, variety. Biologists have found their taxonomy markedly helpful as a means of insuring accuracy of communication about their science and as a means of understanding the organization and interrelation of the various parts of the animal and plant world. You are reading about an attempt to build a taxonomy of educational objectives. It is intended to provide for classification of the goals of our educational system. It is expected to be of general help to all teachers, administrators, professional specialists, and research workers who deal with curricular and evaluation problems. It is especially intended to help them discuss these problems with greater precision. For example, some teachers believe their students should "really understand," others desire their students to "internalize knowledge," still others want their students to "grasp the core or essence" or "comprehend." Do they all mean the same thing? Specifically, what does a student do who "really understands" which he does not do when he does not understand? Through reference to the taxonomy as a set of standard classifications, teachers should be able to define such nebulous terms as those given above. This should facilitate the exchange of information about their curricular developments and evaluation devices. Such interchanges are frequently disappointing now because all too frequently what appears to be common ground between schools disappears on closer examination of the descriptive terms being used.

But beyond this, the taxonomy should be a source of constructive help on these problems. Teachers building a

[1] Webster's New Collegiate Dictionary, Springfield, Mass.: G. & C. Merriam Co., 1953, p. 871.

curriculum should find here a range of possible educational goals or outcomes in the cognitive area ("cognitive" is used to include activities such as remembering and recalling knowledge, thinking, problem solving, creating). Comparing the goals of their present curriculum with the range of possible outcomes may suggest additional goals they may wish to include. As a further aid, sample objectives chosen from a range of subject-matter fields (though mostly from the upper educational levels) are used to illustrate each of the taxonomy categories. These may be suggestive of the kinds of objectives that could be included in their own curriculum.

Use of the taxonomy can also help one gain a perspective on the emphasis given to certain behaviors by a particular set of educational plans. Thus, a teacher, in classifying the goals of a teaching unit, may find that they all fall within the taxonomy category of recalling or remembering knowledge. Looking at the taxonomy categories may suggest to him that, for example, he could include some goals dealing with the application of this knowledge and with the analysis of the situations in which the knowledge is used.

Curriculum builders should find the taxonomy helps them to specify objectives so that it becomes easier to plan learning experiences and prepare evaluation devices. To return to the illustration of the use of the term "understanding," a teacher might use the taxonomy to decide which of several meanings he intended. If it meant that the student was sufficiently aware of a situation or phenomenon to describe it in terms slightly different from those originally used in describing it, this would correspond to the taxonomy category of "Translation." Deeper understanding would be reflected in the next-higher level of the taxonomy, "Interpretation," where the student would be expected to summarize and explain the phenomenon in his description. And there are other levels of the taxonomy which the teacher could use to indicate still deeper "understanding." In short, teachers and curriculum makers should find this a relatively concise model for the analysis of educational outcomes in the cognitive area of remembering, thinking, and problem solving.

Once they have classified the objectives they wish to measure, teachers and testers working on evaluation problems may refer to the discussions of the problems of measuring such objectives. The Handbook includes constructive suggestions for measuring each class of objectives and offers a number of examples of the different item types which have been used by examiners.

Some research workers have found the categories of use as a framework for viewing the educational process and analyzing its workings. For instance, the AERA Committee on Criteria of Teacher Effectiveness suggests its use in analyzing the teacher's success in classroom teaching.[2] Bloom used them in analyzing the kinds of learning that take place in class discussions.[3] Equally important, the psychological relationships employed by the classification scheme are suggestive of psychological investigations which could further our understanding of the educational process and provide insight into the means by which the learner changes in a specified direction.

But any of these uses demands a clear understanding of the structure of the taxonomy, its principles of construction, and its organization. We hope this can be easily acquired by a study of the introductory chapters. In addition, it is suggested that the reader refer early and repeatedly to the condensed version of the taxonomy which has been placed at the back of the book in an appendix for easy reference. The condensed version gives an over-all view of the classification system, brief definitions of the categories, and a few examples of the objectives belonging in each category. For quick reference and a general grasp of the project, the condensed version of the taxonomy will be found to be one of the most valuable parts of the book. The brief overview of historical background plus the description of problems and of the organization of the taxonomy project found in the remainder of this Foreword should further

[2] Remmers, H. H., et al, "Report of the Committee on the Criteria of Teacher Effectiveness," Review of Educational Research, 22 (1952), pp. 245, 246.

[3] Bloom, B. S., "The Thought Processes of Students in Discussion," in Sydney J. French, Accent on Teaching, New York: Harper & Bros., 1954.

orient the reader. Part I of the Handbook is intended to develop some insight into the principles of development and organization of the taxonomy, to develop an understanding of the nature and significance of the cognitive domain, and to give some help on the manner in which objectives may be classified in the taxonomy.

Part II is the taxonomy proper. It consists of the taxonomy categories, sequentially arranged as listed in the condensed version and in the Table of Contents. Each one of the categories contains, in order: (1) a definition of the category; (2) illustrative objectives; (3) a discussion of problems and considerations in testing objectives in the category; and (4) examples of items testing objectives in the category. Each test example is briefly discussed to note what is required of the student and how this is achieved.

History

The idea for this classification system was formed at an informal meeting of college examiners attending the 1948 American Psychological Association Convention in Boston. At this meeting, interest was expressed in a theoretical framework which could be used to facilitate communication among examiners. This group felt that such a framework could do much to promote the exchange of test materials and ideas about testing. In addition, it could be helpful in stimulating research on examining and on the relations between examining and education. After considerable discussion, there was agreement that such a theoretical framework might best be obtained through a system of classifying the goals of the educational process, since educational objectives provide the basis for building curricula and tests and represent the starting point for much of our educational research.

This meeting became the first of a series of informal annual meetings of college examiners. Gathering at a different university each year and with some changes in membership, this group has considered the problems involved in organizing a classification of educational objectives. The group has also considered a great many other problems of examining and of educational research. This is the first product of these meetings.

The committee named on the title page was delegated the task of organizing and writing the various parts of the "cognitive" portion of the taxonomy, while the group continued in its efforts to develop the "affective" portion of the taxonomy. As yet, however, the group is still an informal one without dues, regular membership, or the usual officers. Under such conditions, the committee and the editor must take responsibility for the present product, although "credit" for ideas, suggestions, and sound criticism should be distributed more widely among all those who have attended one or more meetings of the group.

Problems

One of the first problems raised in our discussions was whether or not educational objectives could be classified. It was pointed out that we were attempting to classify phenomena which could not be observed or manipulated in the same concrete form as the phenomena of such fields as the physical and biological sciences, where taxonomies of a very high order have already been developed. Nevertheless, it was the view of the group that educational objectives stated in behavioral form have their counterparts in the behavior of individuals. Such behavior can be observed and described, and these descriptive statements can be classified.

There was some concern expressed in the early meetings that the availability of the taxonomy might tend to abort the thinking and planning of teachers with regard to curriculum, particularly if teachers merely selected what they believed to be desirable objectives from the list provided in the taxonomy. The process of thinking about educational objectives, defining them, and relating them to teaching and testing procedures was regarded as a very important step on the part of teachers. It was suggested that the taxonomy could be most useful to teachers who have already gone through some of the steps in thinking about educational objectives and curriculum.

Some fear was expressed that the taxonomy might lead to fragmentation and atomization of educational purposes

such that the parts and pieces finally placed into the classification might be very different from the more complete objective with which one started. Although this was recognized as a very real danger, one solution for this problem appeared to be setting the taxonomy at a level of generality where the loss by fragmentation would not be too great. The provision of major categories as well as subcategories in the taxonomy enables the user of the taxonomy to select the level of classification which does least violence to the statement of the objective. Further, the hierarchical character of the taxonomy enables the user to more clearly understand the place of a particular objective in relation to other objectives.

Organizational principles

In discussing the principles by which a taxonomy might be developed, it was agreed that the taxonomy should be an educational - logical - psychological classification system. The terms in this order express the emphasis placed on the different principles by which the taxonomy could be developed. Thus, first importance should be given to educational considerations. Insofar as possible, the boundaries between categories should be closely related to the distinctions teachers make in planning curricula or in choosing learning situations. It is possible that teachers make distinctions which psychologists would not make in classifying or studying human behavior. However, if one of the major values of the taxonomy is in the improvement of communication among educators, then educational distinctions should be given major consideration. Second, the taxonomy should be a logical classification in that every effort should be made to define terms as precisely as possible and to use them consistently. Finally, the taxonomy should be consistent with relevant and accepted psychological principles and theories.

It was further agreed that in constructing the taxonomy every effort should be made to avoid value judgments about objectives and behaviors. Neutrality with respect to educational principles and philosophies was to be achieved by constructing a system which, insofar as it was possible,

would permit the inclusion of objectives from all educational orientations. Thus, it should be possible to classify all objectives which can be stated as descriptions of student behavior.

Three domains--cognitive, affective, and psychomotor

Our original plans called for a complete taxonomy in three major parts--the cognitive, the affective, and the psychomotor domains. The cognitive domain, which is the concern of this Handbook, includes those objectives which deal with the recall or recognition of knowledge and the development of intellectual abilities and skills. This is the domain which is most central to the work of much current test development. It is the domain in which most of the work in curriculum development has taken place and where the clearest definitions of objectives are to be found phrased as descriptions of student behavior. For these reasons we started our work here, and this is the first of our work to be published.

A second part of the taxonomy is the affective domain. It includes objectives which describe changes in interest, attitudes, and values, and the development of appreciations and adequate adjustment. Much of our meeting time has been devoted to attempts at classifying objectives under this domain. It has been a difficult task which is still far from complete. Several problems make it so difficult. Objectives in this domain are not stated very precisely; and, in fact, teachers do not appear to be very clear about the learning experiences which are appropriate to these objectives. It is difficult to describe the behaviors appropriate to these objectives since the internal or covert feelings and emotions are as significant for this domain as are the overt behavioral manifestations. Then, too, our testing procedures for the affective domain are still in the most primitive stages. We hope to complete the task but are not able to predict a publication date.

A third domain is the manipulative or motor-skill area. Although we recognize the existence of this domain, we find so little done about it in secondary schools or colleges, that we do not believe the development of a classification

of these objectives would be very useful at present. We would appreciate comments on this point from teachers and other educational workers who are especially interested in this domain of educational objectives.

Development of the cognitive domain

We were naturally hesitant about publishing the cognitive-domain handbook without securing as widespread comment and criticism as possible. Members of the group have discussed the taxonomy with their colleagues in their own institutions, with graduate students in curriculum and testing, and with other groups of teachers and educational specialists. The criticisms and suggestions of these groups have, whenever possible, been taken into consideration in the present volume. A somewhat more formal presentation was made in a symposium at the American Psychological Association meetings in Chicago in 1951.[4]

In spite of these means of communication, we still felt the need for the comments, suggestions, and criticisms of a larger and more representative group of educators, teachers, and educational research workers. With this in mind, we were very pleased when Longmans, Green and Company agreed to print a preliminary edition of 1000 copies before printing the final version of the Handbook. The preliminary edition was sent to a large group of college and secondary school teachers, administrators, curriculum directors, and educational research specialists. This group was asked to read the preliminary edition carefully and to offer criticisms and suggestions, as well as additional illustrations of objectives and test materials. They responded very generously and the present version of the Handbook has taken many of their ideas into consideration. We are truly grateful for the time and thought given to this work.

[4] Symposium: The Development of a Taxonomy of Educational Objectives, H. H. Remmers, Chairman. Participants: B. S. Bloom, Intellectual domain; D. R. Krathwohl, Affective domain. Discussants: O. K. Buros, O. H. Mowrer, and J. M. Stalnaker. Fifty-ninth Annual Meeting of the American Psychological Association, August 31-September 5, Chicago, Illinois.

Thus, this Handbook is truly a group product. It is the direct outgrowth of the thinking of over thirty persons who attended the taxonomy conferences. It is based on the work of countless test constructors, curriculum workers, and teachers. Several hundred readers of the preliminary edition have contributed criticisms, suggestions, and illustrative materials. The committee which took responsibility for the actual writing hope that this Handbook justifies the enormous amount of time and effort devoted to it by the many persons involved. We regard the work as well worth the effort if the taxonomy is found of value as a means of communicating within the field of education. We submit it in the hope that it will help to stimulate thought and research on educational problems.

Since this is a handbook in which a classification scheme is described and illustrated, the reader is cautioned against attempting to read it as though it were a narrative or an exposition of a point of view which could easily be read from cover to cover. The reader may find it profitable to read the introduction and the condensed version of the taxonomy in the Appendix in order to get a quick overview of the entire book. The chapter on educational objectives and curriculum development followed by the chapter on the classification of educational objectives and test exercises will enable him to secure a more thorough understanding of the taxonomy and its possible uses. The remaining sections of the volume--the taxonomy with illustrative objectives and test items--should be read as the reader finds these sections relevant to specific teaching, curriculum, testing and research problems.

CHAPTER 1

THE NATURE AND DEVELOPMENT OF THE TAXONOMY

The taxonomy as a classification device

The major purpose in constructing a taxonomy of educational objectives is to facilitate communication. In our original consideration of the project we conceived of it as a method of improving the exchange of ideas and materials among test workers, as well as other persons concerned with educational research and curriculum development. For instance, the use of the taxonomy as an aid in developing a precise definition and classification of such vaguely defined terms as "thinking" and "problem solving" would enable a group of schools to discern the similarities and differences among the goals of their different instructional programs. They could compare and exchange tests and other evaluative devices intended to determine the effectiveness of these programs. They could, therefore, begin to understand more completely the relation between the learning experiences provided by these various programs and the changes which take place in their students.

Set at this level, the task of producing a taxonomy, that is, a classification of educational outcomes, is quite analogous to the development of a plan for classifying books in a library. Or, put more abstractly, it is like establishing symbols for designating classes of objects where the members of a class have something in common. In a library these symbols might be the words "fiction" and "nonfiction" and would apply to classes of books having something in common. If the problem is essentially one of finding new symbols for the classes, any set of symbols, numbers, nonsense syllables, or words could be used. Thus, we could have used the symbols "F" and "NF" for fiction and nonfiction. Further, since the symbols selected are not intended to convey that one class is of a higher order than another or that there is any particular relationship between the classes, they can be selected in very arbitrary fashion.

The labels "fiction" and "nonfiction" do not imply that the one class of book is better, more abstract, or more complex than the other kind.

Of course, such a classification procedure cannot be a private fantasy since it is of value only if used by the workers who wish to communicate with each other. Thus, the classifications "fiction" and "nonfiction" are of value only if librarians use them. Acceptance of such classifications by potential users is likely to be facilitated if the class names are terms which are reasonably familiar to them and if these terms are given precise and usable definitions. Thus, one might expect more ready acceptance of a library classification scheme if he took such a term as "fiction," which is already in use, and defined it so that any competent librarian would easily be able to determine which books fit the classification.

In summary then, the major task in setting up any kind of taxonomy is that of selecting appropriate symbols, giving them precise and usable definitions, and securing the consensus of the group which is to use them. Similarly, developing a classification of educational objectives requires the selection of an appropriate list of symbols to represent all the major types of educational outcomes. Next, there is the task of defining these symbols with sufficient precision to permit and facilitate communication about these phenomena among teachers, administrators, curriculum workers, testers, educational research workers, and others who are likely to use the taxonomy. Finally, there is the task of trying the classification and securing the consensus of the educational workers who wish to use the taxonomy.

What is to be classified

Before one can build a classification scheme, it must be clear what it is that is to be classified. This is not much of a problem when one is classifying books. But descriptions of curricula are set up on such different bases as descriptions of teacher behavior, descriptions of instructional methods, and descriptions of intended pupil behaviors. As achievement testers and educational research workers, the

major phenomena with which we are concerned are the changes produced in individuals as a result of educational experiences. Such changes may be represented by the global statements of the educational objectives of an educational unit, or they may be represented by the actual description of the student behaviors which are regarded as appropriate or relevant to the objectives. Objectives may also be inferred from the tasks, problems, and observations used to test or evaluate the presence of these behaviors.

We are of the opinion that although the objectives and test materials and techniques may be specified in an almost unlimited number of ways, the student behaviors involved in these objectives can be represented by a relatively small number of classes. Therefore, this taxonomy is designed to be a classification of the student behaviors which represent the intended outcomes of the educational process. It is assumed that essentially the same classes of behavior may be observed in the usual range of subject-matter content, at different levels of education (elementary, high-school, college), and in different schools. Thus, a single set of classifications should be applicable in all these instances.

It should be noted that we are not attempting to classify the instructional methods used by teachers, the ways in which teachers relate themselves to students, or the different kinds of instructional materials they use. We are not attempting to classify the particular subject matter or content. What we are classifying is the intended behavior of students--the ways in which individuals are to act, think, or feel as the result of participating in some unit of instruction. (Only such of these intended behaviors as are related to mental acts or thinking are included in the part of the taxonomy developed in this Handbook.)

It is recognized that the actual behaviors of the students after they have completed the unit of instruction may differ in degree as well as in kind from the intended behaviors specified by the objectives. That is, the effects of instruction may be such that the students do not learn a given skill to the desired level of perfection; or, for that matter, they may not develop the intended skill to any degree.

This is a matter of grading or evaluating the goodness of the performance. The emphasis in the Handbook is on obtaining evidence on the extent to which desired and intended behaviors have been learned by the student. It is outside the scope of the task we set ourselves to properly treat the matter of determining the appropriate value to be placed on the different degrees of achievement of the objectives of instruction.

It should also be noted that the intended behaviors specified by educational objectives do not include many of the behaviors which psychologists are interested in classifying and studying. One reason is that the intended behaviors represent the social goals imposed upon youngsters by their society or culture. Thus, the intended or desired behaviors included in educational objectives usually do not include undesirable or abnormal behaviors which are socially disapproved. Similarly, certain natural or unsocialized behaviors which might be of interest to psychologists may fall outside the categories of the taxonomy.

Our present studies of the affective area have indicated that the selective nature of intended behaviors will be even more apparent there than in the cognitive domain. The fact that we include objectives which specify social and emotional adjustment as a part of the affective domain points up this fact.

Guiding principles

Since the determination of classes and their titles is in some ways arbitrary, there could be an almost infinite number of ways of dividing and naming the domains of educational outcomes. To guide us in our selection of a single classification system and to make the product more readily understood and used, we established certain guiding principles. First, since the taxonomy is to be used in regard to existing educational units and programs, we are of the opinion that the major distinctions between classes should reflect, in large part, the distinctions teachers make among student behaviors. These distinctions are revealed in the ways teachers state educational objectives. They are also

found in their curricular plans, their instructional material, and their instructional methods. To the extent it was possible, the subdivisions of the taxonomy are intended to recognize these distinctions.

A second principle is that the taxonomy should be logically developed and internally consistent. Thus, each term should be defined and used in a consistent way throughout the taxonomy. In addition, each category should permit logical subdivisions which can be clearly defined and further subdivided to the extent that appears necessary and useful.

A third principle is that the taxonomy should be consistent with our present understanding of psychological phenomena. Those distinctions which are psychologically untenable, even though regularly made by teachers, would be avoided. Further, distinctions which seem psychologically important, even though not frequently made in educational objectives, would be favorably considered for inclusion. Perhaps it should be reiterated that, since the taxonomy deals only with educationally intended behavior, it falls considerably short of being a classification scheme for all psychological phenomena.

A fourth principle is that the classification should be a purely descriptive scheme in which every type of educational goal can be represented in a relatively neutral fashion. Thus, the Dewey decimal classification system for libraries describes all the classes of books. It does not indicate the value or quality of one class as compared with another, nor does it specify the number and kind of books any particular library should possess. Similarly, 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 inclusive 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. On the other hand, the taxonomy will probably include a greater variety of behaviors than those emphasized by any one school, course,

or educational philosophy. Thus, one course might have objectives classifiable in four of the categories, another in only three of the categories, and so on.

In one sense, however, the taxonomy is not completely neutral. This stems from the already-noted fact that it is a classification of intended behaviors. It cannot be used to classify educational plans which are made in such a way that either the student behaviors cannot be specified or only a single (unanalyzed) term or phrase such as "understanding," or "desirable citizen," is used to describe the outcomes. Only those educational programs which can be specified in terms of intended student behaviors can be classified.

Developing the taxonomy

Keeping in mind the aforementioned principles, we began work by gathering a large list of educational objectives from our own institutions and the literature. We determined which part of the objective stated the behavior intended and which stated the content or object of the behavior. We then attempted to find divisions or groups into which the behaviors could be placed. We initially limited ourselves to those objectives commonly referred to as knowledge, intellectual abilities, and intellectual skills. (This area, which we named the cognitive domain, may also be described as including the behaviors: remembering; reasoning; problem solving; concept formation; and, to a limited extent, creative thinking.) We proceeded to divide the cognitive objectives into subdivisions from the simplest behavior to the most complex. We then attempted to find ways of defining these subdivisions in such a way that all of us working with the material could communicate with each other about the specific objectives as well as the testing procedures to be included.

We have not succeeded in finding a method of classification which would permit complete and sharp distinctions among behaviors. (This is discussed in more detail in Chapter 3, which considers the problem of classifying objectives and test exercises.) There are two basic views. First, we were again made aware of what any teacher knows—two boys may appear to be doing the same thing;

but if we analyze the situation, we find they are not. For example, two students solve an algebra problem. One student may be solving it from memory, having had the identical problem in class previously. The other student has never met the problem before and must reason out the solution by applying general principles. We can only distinguish between their behaviors as we analyze the relation between the problem and each student's background of experience. This then introduces a new aspect to the classification problem, namely, the experiential backgrounds of the students to whom the objective is to apply. As is indicated in Chapter 3, this may be a very important factor in using the taxonomy to classify test exercises.

A second difficulty in classification results from the fact that the more complex behaviors include the simpler behaviors. If we view statements of educational objectives as intended behaviors which the student shall display at the end of some period of education, we can then view the process as one of change. As teachers we intend the learning experiences to change the student's behavior from a simpler type to another more complex one which in some ways at least will include the first type.

One may take the Gestalt point of view that the complex behavior is more than the sum of the simpler behaviors, or one may view the complex behavior as being completely analyzable into simpler components. But either way, so long as the simpler behaviors may be viewed as components of the more complex behaviors, we can view the educational process as one of building on the simpler behavior. Thus, a particular behavior which is classified in one way at a given time may develop and become integrated with other behaviors to form a more complex behavior which is classified in a different way. In order to find a single place for each type of behavior, the taxonomy must be organized from simple to complex classes of behavior. Furthermore, for consistency in classification, a rule of procedure may be adopted such that a particular behavior is placed in the most complex class which is appropriate and relevant.

But, having specified that the classes shall be arranged from simple to complex, we have exceeded the simple classification scheme which called primarily for a series of categories without order or rank. The next section addresses itself to this problem.

The problem of a hierarchy—classification versus taxonomy

We have so far used the terms "classification" and "taxonomy" more or less interchangeably. It is necessary, however, that we examine the relationship between these terms because, strictly speaking, they are not interchangeable. Taxonomies, particularly Aristotelian taxonomies, have certain structural rules which exceed in complexity the rules of a classification system. While a classification scheme may have many arbitrary elements, a taxonomy scheme may not. A taxonomy must be so constructed that the order of the terms must correspond to some "real" order among the phenomena represented by the terms. A classification scheme may be validated by reference to the criteria of communicability, usefulness, and suggestiveness; while a taxonomy must be validated by demonstrating its consistency with the theoretical views in research findings of the field it attempts to order.

As educators and specialists in research, we are interested in a long-term inquiry into the nature of the phenomena with which we deal, and no simple set of terms and definitions by itself really is a satisfactory tool in making this inquiry. We need a method of ordering phenomena such that the method of ordering reveals significant relationships among the phenomena. This is the basic problem of a taxonomy—to order phenomena in ways which will reveal some of their essential properties as well as the interrelationships among them. Members of the taxonomy group spent considerable time in attempting to find a psychological theory which would provide a sound basis for ordering the categories of the taxonomy. We reviewed theories of personality and learning but were unable to find a single view which, in our opinion, accounted for the varieties of behaviors represented in the educational objectives we attempted to classify. We were reluctantly forced to agree with Hilgard[1] that each theory of learning accounts for some phenomena very well but is less adequate in accounting for others. What is needed is a larger synthetic theory of learning than at present seems to be available. We are of the opinion that our method of ordering educational outcomes will make it possible to define

[1] Hilgard, E. R., Theories of Learning (Century Psychology Series), New York: Appleton—Century—Crofts, 1948.

the range of phenomena for which such a theory must account. The taxonomy also uses an order consistent with research findings and it should provide some clues as to the nature of the theory which may be developed. This is an extremely complex problem; and although it has probably not been solved completely satisfactorily, it is the opinion of the writers that we have made some progress toward a solution.

As the taxonomy is now organized, it contains six major classes:

1.00 Knowledge
2.00 Comprehension
3.00 Application
4.00 Analysis
5.00 Synthesis
6.00 Evaluation

Although it is possible to conceive of these major classes in several different arrangements, the present one appears to us to represent something of the hierarchical order of the different classes of objectives. As we have defined them, the objectives in one class are likely to make use of and be built on the behaviors found in the preceding classes in this list. The reader is referred to the condensed version of the taxonomy in the Appendix for a brief definition of each class and its subclasses. Fuller treatment of the taxonomy will be found in Part II of this volume.

Our attempt to arrange educational behaviors from simple to complex was based on the idea that a particular simple behavior may become integrated with other equally simple behaviors to form a more complex behavior. Thus our classifications may be said to be in the form where behaviors of type A form one class, behaviors of type AB form another class, while behaviors of type ABC form still another class. If this is the real order from simple to complex, it should be related to an order of difficulty such that problems requiring behavior A alone should be answered correctly more frequently than problems requiring AB. We have studied a large number of problems occurring in our comprehensive examinations and have found some evidence to support this hypothesis. Thus, problems requiring knowledge of specific facts are generally answered correctly more

frequently than problems requiring a knowledge of the universals and abstractions in a field. Problems requiring knowledge of principles and concepts are correctly answered more frequently than problems requiring both knowledge of the principle and some ability to apply it in new situations. Problems requiring analysis and synthesis are more difficult than problems requiring comprehension. Scatter plots of the performances of individuals on one test composed of items at a simple level in the taxonomy against their performances on another test composed of items at a more complex level in the taxonomy show that it is more common to find that individuals have low scores on complex problems and high scores on the less complex problems than the reverse. Our evidence on this is not entirely satisfactory, but there is an unmistakable trend pointing toward a hierarchy of classes of behavior which is in accordance with our present tentative classification of these behaviors.

While we have been primarily concerned with the cognitive domain, we have done some thinking about the classification versus taxonomy problem as it applies to all the domains. The arrangement of behaviors from simple to complex and the differentiation of behaviors into three domains—the cognitive, the psychomotor, and the affective—were made primarily from an educational viewpoint. That is, these are the distinctions which teachers make in the development of curriculum and teaching procedures. We as educational testers also make similar distinctions. As we examine the classification system so far developed, however, we note an additional dimension not usually considered in educational and teaching procedures. One of the major threads running through all the taxonomy appears to be a scale of consciousness or awareness. Thus, the behaviors in the cognitive domain are largely characterized by a rather high degree of consciousness on the part of the individual exhibiting the behavior, while the behaviors in the affective domain are much more frequently exhibited with a low level of awareness on the part of the individual. Further, in the cognitive domain especially, it appears that as the behaviors become more complex, the individual is more aware of their existence. We are of the opinion that this applies to the other domains as well. Clearly there is no precise scale of consciousness which may be used to

test these speculations. However, some of our research on the thought processes involved in problem solving[2] indicates that students are able to give more complete reports of their attack on a problem as the problem becomes more complex, that is, as the problem is classified in the more complex classes of intellectual abilities and skills.

If the level of consciousness can be demonstrated to be an important dimension in the classification of behavior, it would pose a great range of problems and point to a whole new set of relationships which would be of interest to researchers in the field of educational psychology. One might hope that it would provide a basis for explaining why behaviors which are initially displayed with a high level of consciousness become, after some time and repetition, automatic or are accompanied by a low level of consciousness. Perhaps this would provide a partial basis for explaining why some learning, especially of the affective behaviors, is so difficult. Perhaps it will also help to explain the extraordinary retention of some learning — especially of the psychomotor skills.

Is the taxonomy a useful tool?

We have subjected this classification scheme to a series of checks, primarily of communicability and comprehensiveness. A major check of communicability was to determine whether a number of workers could agree in their classification of specific educational objectives and test materials. Members of the taxonomy group discussed the classification of particular objectives in certain categories, and many ambiguities and inconsistencies were pointed out which we have attempted to remedy. Perhaps the most complete test of the classifications and their definitions has been the attempt of members of the group to classify a large number of test items. One of the major problems in the classification of test items which this study revealed is that it is necessary in all cases to know or assume the nature of the

[2] Bloom, B. S., and Broder, Lois, Problem-solving processes of college students (A Supplementary Educational Monograph), Chicago: University of Chicago Press, Summer, 1950.

examinees' prior educational experiences. Thus, a test problem could require a very complex type of problem-solving behavior if it is a new situation, while it may require little more than a simple kind of recall if the individual has had previous learning experiences in which this very problem was analyzed and discussed. This suggests that, in general, test material can be satisfactorily classified by means of the taxonomy only when the context in which the test problems were used is known or assumed.

Comprehensiveness, of course, is never finally determined. We have repeatedly taken lists of objectives found in courses of study and other educational literature and have attempted to classify them. As yet, in the cognitive domain we have encountered few statements of student behaviors which could not be placed within the classification scheme. However, although we have little difficulty in determining the major class within which a behavior falls, we still are not satisfied that there are enough clearly defined subclassifications to provide adequately for the great variety of objectives we have attempted to classify.

In addition to comprehensiveness and communicability, the taxonomy should satisfy two other criteria if it is to be regarded as a useful and effective tool. First, it should stimulate thought about educational problems. If the taxonomy is to prove a useful tool for educational research workers, it must aid them in formulating hypotheses about the learning process and changes in students. If it is to be useful for teachers and testers, it should provide a basis for suggestions as to methods for developing curricula, instructional techniques, and testing techniques. As a highly organized and presumably comprehensive plan for classifying educational behaviors, it should form the basis for easily determining the availability of relevant evaluation instruments, techniques, and methods so that each worker can determine their appropriateness for his own work. Properly used, a taxonomy should provide a very suggestive source of ideas and materials for each worker and should result in many economies in effort.

The early drafts of the taxonomy have already been extensively used. Some of the examiners have found it useful as an aid in helping the faculty formulate objectives more precisely and in seeing a possible range of educational objectives. The major categories of the taxonomy have been used in several institutions as a basis for classifying test material. The parallelism of objectives in different subject-matter fields is highlighted by this procedure, thus suggesting points of possible integration. Further, the transferability of testing techniques from one subject field to another becomes clear. In at least one institution, diagnostic reports of test results to students are made in relation to the taxonomy. In this same institution, reports to the faculty on the relation of the test results to the objectives and learning experiences are analyzed in terms of the taxonomy.

Stimulation of thought on educational problems may also occur through the use of the taxonomy in organizing some of the literature on educational research. Used in this way, it gives a relatively fresh view to some of this research and reveals many problems which have been largely ignored by educational psychologists, curriculum workers, and testers. Some of the studies on the relationship between measures of scholastic aptitude or intelligence and the evidence on the development of particular classes of behaviors have been brought together. [3] This has revealed rather strikingly the relatively low relationship between tests of some of the more complex cognitive abilities and skills and measures of intelligence. Thus, the view that measures of the higher mental processes are synonymous with measures of scholastic aptitude does not seem to be well-founded. This view has frequently been used to support the contention that, since intelligence is presumed to be constant, little can be done to develop some of the higher mental processes through educative experiences.

[3] Furst, Edward J., "Relationship between tests of intelligence and tests of critical thinking and knowledge," Journal of Educational Research, Vol. 43, No. 8, April 1950, pp. 614-25.

Available evidence has also been assembled on the interrelations among educational objectives. [4, 5] These data give considerable support to the generalization that the relationships among measures of different objectives are determined by the nature of the learning experiences which the students have had. Thus, it seems possible under one curriculum to integrate various behaviors in such a way that very high correlations are obtained among the measures of the different objectives while under another curricular plan the correlations among the measures of the different objectives do not depart very much from chance. This has been a long-neglected area in curricular planning and educational research.

We have also attempted to organize some of the literature on the growth, retention, and transfer of the different types of educational outcomes or behaviors. Here we find very little relevant research. [6] For the most part, research on problems in retention, growth, and transfer has not been very specific with respect to the particular behavior involved. Thus, we are usually not able to determine from this research whether one kind of behavior is retained for a longer period of time than another or which kinds of educative experiences are most efficient in producing a particular kind of behavior. Many claims have been made for different educational procedures, particularly in relation to permanence of learning; but seldom have these been buttressed by research findings.

Altogether, the taxonomy is suggestive in pointing to a large number of problems in the field of education and testing. If the taxonomy could do nothing more than this, it would be useful. Although there are dangers in devising

[4] Furst, Edward J., "Effect of the organization of learning experiences upon the organization of learning outcomes," Journal of Experimental Education, XVIII (March 1954), pp. 215-28.

[5] Dressel, Paul L., and Mayhew, Lewis B., General Education: Explorations in Evaluation, Washington, D. C.: American Council on Education, 1954, pp. 249-53.

[6] Several of the more relevant references are listed in the footnotes on page 42.

a classification scheme which might tend to rigidify our thinking about education, the relatively chaotic nature of our field at present and the great emphasis on persuasive skills rather than on research findings for claims in the field of education justify some procedure such as this for ordering the phenomena with which we deal.

A final criterion is that the taxonomy must be accepted and used by the workers in the field if it is to be regarded as a useful and effective tool. Whether or not it meets this criterion can be determined only after a sufficient amount of time has elapsed. We have attempted to secure the participation of a large number of achievement testers and evaluation specialists in the actual development and criticism of the classification scheme. The bulk of the comments from administrators, teachers, curriculum specialists, and educational research workers on the preliminary edition of the taxonomy indicate that there is a real need for this kind of device. We do not regard it as perfect or as completed. We expect to continue to work on the development of the other domains and to revise this Handbook as experience dictates the need for improvement. We solicit your help in its further development by asking that you send us the suggestions which occur to you as you attempt to understand it and as you develop a body of experience through its use.

CHAPTER 2

EDUCATIONAL OBJECTIVES AND CURRICULUM DEVELOPMENT

We have had some question about the relevance of this section in a handbook devoted to the details of a classification system. We have finally included it because we believe the classification and evaluation of educational objectives must be considered as a part of the total process of curriculum development. Some of these considerations help to clarify the distinctions made in the taxonomy. It is hoped that many teachers will find this chapter useful as a summary of some of the arguments for inclusion of a greater range of educational objectives than is typical at the secondary school or college level.

Problems of developing curriculum and instruction are usually considered in relation to four major types of questions.[1]

1. What educational purposes or objectives should the school or course seek to attain?
2. What learning experiences can be provided that are likely to bring about the attainment of these purposes?
3. How can these learning experiences be effectively organized to help provide continuity and sequence for the learner and to help him in integrating what might otherwise appear as isolated learning experiences?
4. How can the effectiveness of learning experiences be evaluated by the use of tests and other systematic evidence-gathering procedures?

[1] The content of this section has been largely drawn from Ralph W. Tyler, "Achievement Testing and Curriculum Construction," Trends in Student Personnel Work, E. G. Williamson, Ed., Minneapolis, Minn.: University of Minnesota Press, 1949, pp. 391-407.