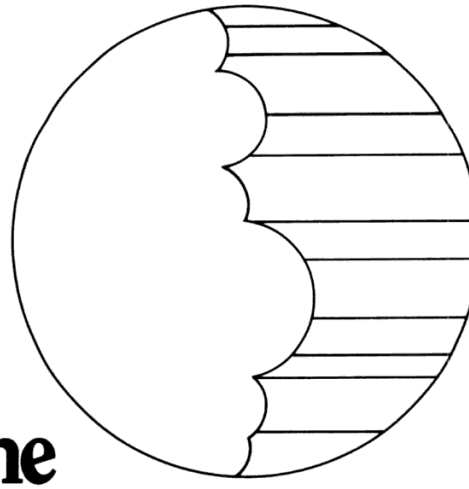
The Affective and Cognitive Domains:

Integration for Instruction and Research

Barbara L. Martin & Leslie J. Briggs



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B.L.M.
September, 1985

The Affective and Cognitive Domains:

Integration for Instruction and Research

Introduction to Part I: The Problem and a Proposed Solution

In the *Preface* to this book, we noted that the management of instruction is no longer the exclusive province of schools, home, and church, as was the case in the past. Almost all private and public organizations and institutions now conduct instruction, especially for adults. There is now a widespread demand for instruction in basic and specialized skills, and for increased attention to the development of attitudes, values, ethics, and self-actualization.

Unfortunately, the old theories of learning and instruction and traditional models of teaching do not point clearly to techniques by which both cognitive and affective behaviors may be developed by instruction which brings a planned integration of cognitive and affective objectives. Separate groups of people, among both researchers and practitioners, have dealt separately with instruction for cognitive and affective outcomes. This is the problem we address in this book. Our goal is to help overcome this separation of the two domains by offering techniques for integrating instruction in cognition and affect, and to more directly tie curriculum and instruction to life-long needs and goals.

In the two chapters which comprise Part I, we expand upon both the problem and the proposed approach to a solution for it. In Chapter 1, we state our eclectic theoretical posture while announcing that we adapt a system design strategy for searching for a solution. In that chapter we give our first overview of our approach to a solution. There we also acknowledge the need to first clarify the affective domain so that we can make maximum use of theory, research, and models of teaching in building our approach to designing instruction to solve the problem of the

separation of the two domains. We accept the complexity encountered in our view of the affective domain as consisting of all types of instructional objectives which cannot be classified as cognitive or psychomotor.

In opening Chapter 2, we pause to acknowledge the many influences upon learning which arise from sources outside the classroom as well as from those within the classroom. We then present an overview of the questions to be answered in design of curriculum and instruction. Finally, we identify and briefly discuss some dozen component processes in our recommended approach to the integrating of instruction in the cognitive and affective domains. This early introduction of those components, we hope, will give the reader a first framework for the more detailed description of our model for instruction, which fills Parts III, IV, and V of this book.

Part II of this book presents our review of research in all components of the affective domain. It may be of special interest to theorists and researchers. Some practitioners may wish to go directly from Part I to Part III. However, we have placed Part II where it is because it is the data background from which we derived many of the practical applications presented in Parts III, IV, and V.

In Part I, many of the important instructional and curricular design components for our model of instruction are first mentioned. Later on, there is intentional redundancy in the sense that we "return again," or "spiral" our discussion and elaboration of the building blocks in our design approach. We hope by doing this to enable the reader to gradually accumulate understanding of our intended meaning of each concept or building block.

We have undertaken an important task of enormous complexity. In Parts I and II, we attempt to acknowledge that complexity while giving some order to it. We also attempt to point out aspects of the total problem which we do not address directly in the more applied technique portions of the book. We hope that other researchers and practitioners will find this book to be of assistance in their criticism, adaptation, or adoption of some of the techniques we recommend.

Chapter 1

The Problem of Domain Separation and an Approach for Integration

INSTRUCTIONAL THEORY

THE NEED TO STUDY DOMAIN INTERACTIONS

THE AFFECTIVE DOMAIN

Domain Taxonomies

Means vs. End

Curricular and Instructional Spirals

Summary of the Affective Domain

APPROACHES TO INTEGRATING THE AFFECTIVE AND COGNITIVE DOMAINS

Sequencing of Instruction

Lesson Design

SUMMARY

Chapter 1

The Problem of Domain Separation and an Approach for Integration

Educational researchers, theorists, and practitioners have to date conceptually separated affective and cognitive behaviors into two distinct domains. The original purpose of this separation was to clarify the behaviors in each domain and to facilitate research and study of the behaviors. Evidence of the effect of this conceptual separation can be seen in the instructional theories, models of teaching, and instructional design models that have been developed. While most agree that the two domains interact in actual learning, each domain has been studied and taught with little attention to its counterpart. We believe that this oversight can be corrected, and that the two domains can and should be integrated in the design of instruction.

In this first chapter, we begin to explore the problem of domain separation and to search for a solution (domain integration). The purposes of this chapter are to:

1. Explain how the development of a more comprehensive instructional theory can assist in organizing a solution to the problem.
2. Describe the nature of the problem.
3. Give an overview of our approach to a solution to the problem.

INSTRUCTIONAL THEORY

Instructional theories are developed to organize ideas, data,

hunches, and educated guesses into frameworks that provide a comprehensive but parsimonious description of how to influence learner achievements. There are two primary ways to construct a theory: a deductive approach and an inductive approach. A theory developed deductively provides a reasonable, legitimate, and conceptually consistent set of rules and constructs that can be defined logically but that has not been subjected to empirical verification. These theories often begin with a researcher's synthesis of literature reviews, logical thought, knowledge of practice, and application of sheer brain power. On the other hand, an inductively developed theory begins with empirical data that describe and explain some phenomena and then builds on those data to derive generalizations with greater explanatory power. Verified findings form the core of an inductively derived theory.

Neither of these theory building types is pure, and there are problems with both approaches. Top-down or deductive theories are only as good and useful as the original propositions. If the logic used in deriving the propositions is incorrect, the propositions will be incorrect. In addition, considerable time will have been spent attempting to verify the propositions and conducting unnecessary, though not necessarily wasted, research. Bottom-up or inductive theories, though steeped in research findings, are often limited in scope and, therefore, in explanatory power. The miniature models that are built come almost directly from the data, are usually somewhat restricted, and often address low-level questions. Likewise, they are rarely integrated with other theories dealing with similar issues and findings.

According to Snelbecker (1974), theory building is an important activity because theories enable us to (a) systematize findings and reduce complex phenomena by organizing and tying together seemingly unrelated events or results; (b) generate hypotheses and, therefore, guide research efforts; (c) make predictions about expected findings; and (d) provide explanations that essentially help answer the question *why*. While no theory is all-inclusive nor a panacea that explains or solves all problems, theories do provide a starting point for a search for solutions. They help us ask specific questions, focus our research efforts, and enable us to begin to discover some answers.

What we have set out to do in this book is to develop a framework for an instructional theory that will help us synthesize what we know about the development of attitudes, values, and feelings with what we know about the development of intellectual abilities. We have used a deductive theory building approach, and our focus has been on instructional theories rather than learning theories. Instructional and learning theories differ in that the former is primarily concerned with applications and practical principles about how to influence learner changes, whereas the latter deals with descriptions and predictions about how and why learning occurs.

The strategy we used for developing a theoretical framework was deductive. We have recognized a problem, that is, that there has been little integration of cognitive and affective behaviors in instruction and research. We have seen examples of the problem in practice; we have searched the literature for clues about the origin and solution to the problem; and we have expended both time and effort thinking about a way to approach the problem. The result is the beginning of a theory that enables us to systematize findings, generate hypotheses, make some predictions, and provide guidance to practice. We have made major strides in some areas, less in others.

In this first chapter, we begin by providing some background into the problem and our theoretical orientation for discussing it. We then give an overview of how integration of cognitive and affective behaviors might proceed. In later chapters we will delve further into specific aspects of the problem and the solution.

THE NEED TO STUDY DOMAIN INTERACTIONS

Educational psychologists and researchers have found it convenient, for theory construction and research purposes, to divide the varieties of human learning and learning outcomes into three conceptually distinct categories or domains: the *cognitive* domain, the *affective* domain, and the *psychomotor* domain. This division was, for the most part, arbitrary since psychologists and educators agreed that in actuality, that is, in teaching and real-life learning situations, no true separation of cognitive, affective, and psycho-

motor states was possible (Bloom, 1976; English & English, 1958; Fishbein, 1967, Gagné, 1970; Gordon, 1970; Gephart & Ingle, 1976; Payne, 1976; Rokeach, 1960; Transgaard, 1973; Wyer, 1974).

While it is generally accepted that no true separation of the domains can occur in any practical learning situation or in any comprehensive theory of learning or instruction, educators have studied the domains as though they are separate, distinct entities. For example, a cursory examination of learning and instruction theories, models of teaching, and domain taxonomies demonstrates that researchers have, for the most part, addressed one domain or the other (Ausubel, 1963; Bruner, Goodnow & Austin, 1967; Gagné, 1977; Gephart & Ingle, 1976; Krathwohl, Bloom & Masia, 1964; Rogers, 1951, 1969).

In addition to the conceptual separation of the domains in the professional literature, we also recognized three "in practice" types of evidence of failure to address domain interactions. The first was discovered when studying the educational change literature on the adoption of innovations. The adoption process, described in the literature as an example of how any kind of learning occurs, is only successful when both cognitive and affective behaviors are developed in the audience responsible for implementing the change. That is, implementers must develop both the cognitive skills and behaviors necessary for implementing an innovation and positive attitudes toward the innovation. Research into the adoption process has stated fairly strongly that the failure of many adoption efforts can be attributed to the potential implementer's lack of positive attitudes toward the innovation. Usually, the cognitive skills were developed, i.e., most adopters understood and could use a particular innovation, but most did not have favorable attitudes toward it. Change agents had spent their time developing the client's cognitive abilities, but had failed to develop appropriate affective behaviors. Partly as a result of this oversight, many adoption efforts failed.

The second type of evidence of the neglect of attention to integration of affective and cognitive outcomes in the design of instruction is found in the models of teaching developed by educators and others. Joyce and Weil (1980) have summarized a

number of such models of teaching. When each model is examined, it is found to be a contribution to teaching in either the affective or cognitive domain, but not to both. Thus the integration sought in this book was lacking in our review of models of teaching.

The third kind of instance of lack of attention to domain interaction was seen in the literature and practical applications of instructional design procedures. Actually, it was not that domain interactions were not acknowledged, but that techniques for influencing motivation and other affective behaviors were rarely addressed (Briggs, 1984). The powerful influences of a motivated learner and motivational materials coupled with any given learner's attitude toward a subject, school, or learning are well documented in educational and psychology literature. Yet, instructional designers have spent very little time developing theories or models that address affective behaviors and even less time integrating them with cognitive behaviors. This fact is also noted by Reigeluth (1983a, p. 79).

The neglect of the domain integration problem is also evident in other respects. For example, the events surrounding the "Sputnik era" prompted an almost total dedication to the cognitive aspects of the curriculum. Many of the "new curricula projects" were developed to teach learners cognitive skills, strategies, and knowledge. Little attention was paid to the affective aspects of the curricula. Although a hidden affective goal was sometimes claimed, it was obscured and not directly taught.

In spite of the above instances of the neglect of domain integration in current practices and delivery systems, there is a growing demand for attention to the affective domain. Public schools, medical schools, and business and industrial settings are now paying direct attention to the development of learners' attitudes, values, morals, ethics, human relationships, and self-esteem. The public seems ready to demand both competence in cognitive skills and attention to affective needs.

It was primarily recognition of the above instances of separation of the domains and the renewed interest in affective behaviors that led us to undertake the theory building work that is the topic of this book. Division of behavior into three domains has resulted in

at least two major unfortunate consequences: (a) the *interactions* of learning in each domain with learning in the other domains has remained obscure, and (b) few guidelines have been developed to show how objectives should be sequenced and taught to achieve the goals in all three domains. Our intent is to remove the artificial barriers that have arisen among the domains, with special reference to showing how to *integrate* the affective and the cognitive domains, in both instruction and research. We thus exclude the psychomotor domain from our work, while acknowledging its role as an important domain in education and in training.

THE AFFECTIVE DOMAIN

One reason why integration of the affective and cognitive domains has rarely been attempted is that affective behaviors are difficult to conceptualize and to evaluate. Because of this, the most effort and time have gone into thinking about, studying, evaluating, and teaching the cognitive aspects of behavior. Cognitive behaviors are easier to specify, operationalize, and measure than are affective behaviors. Evidence of this can be seen in the extensive taxonomic work done in the cognitive domain by researchers such as Bloom (1956), Gagné (1962, 1965, 1977), Guilford (1967), and Gerlach and Sullivan (1967).

The affective domain poses a unique set of problems for educators. First, the definition of the domain and the concepts that comprise it are so broad and often unfocused that all aspects of behavior not clearly cognitive or psychomotor are lumped together in a category called the affective domain. For example, all of the following terms can be found associated with affect: self-concept, motivation, interests, attitudes, beliefs, values, self-esteem, morality, ego development, feelings, need achievement, locus of control, curiosity, creativity, independence, mental health, personal growth, group dynamics, mental imagery, and personality. As educators we are directly or indirectly concerned with each of these, and since they appear not to be cognitive or psychomotor, the catch-all phrase has *become* "the affective domain."

The definitional problem is further compounded when one

looks within and between disciplines for clarification. Some psychologists define affect as a physiological or biological state; educators and other psychologists interested in behavior changes define affect as a cognitive type process (Bills, 1976).

These definitional problems are at least partly responsible for another set of problems related to affective behaviors. The lack of definition and focus has made measurement of and research related to the domain difficult; and it has made translation of affective behaviors into classroom practices inadequate. Bills (1976) states:

> . . . 1) We are not close to an agreement about what affect is or what to call it. 2) What we are trying to measure is so unclear to us that we cannot develop instruments with acceptable psychometric qualities, and . . . I have concluded that unless we can achieve a better concept of affect, we will never be able to deal with it in our classrooms or in our research (p. 10).

In addition to these definitional and measurement problems, there are other problems associated with the affective domain. These include:

1. The belief by some educators that affective goals are so long range and intangible that regular classroom time restrictions (e.g., periods, semesters, years) prohibit development and measurement of affective outcomes (Bloom, Hastings, and Madaus, 1971).
2. Fear that discussions of values, attitudes, morals, and other aspects of the domain may be viewed as indoctrination or "brainwashing" (Bloom *et al.*, 1971).
3. Recognition that in the affective domain the *absence* of behaviors is often as important, if not more so, than the presence of behaviors.
4. The inability to identify and specify affective behaviors because our language does not always lend itself to clarity.
5. Uneasiness about some of the methods associated with attitude change, e.g., classical conditioning, operant conditioning, and persuasive communications.
6. Disagreement and confusion about whether affective behavior are *ends* (outcomes) or *means* to ends.

While acquisition of affective goals and learning outcomes is a priority in many educational settings, the problems associated with the domain often make success difficult to achieve. Not only is the domain hard to define, operationalize, and measure, but educators are concerned about how to go about influencing affective behaviors without indoctrinating learners or compromising their own professional ethics. Yet, the task of integrating the cognitive and affective domains is only possible when we have (a) some clearer notions of the scope and boundaries of the affective domain, and (b) some way to differentiate between abstract and poorly defined concepts. We address some of these problems in greater depth later in the book, but briefly consider several of these here.

Domain Taxonomies

The classification of behaviors into taxonomies is one way researchers in many fields have set boundaries to delineate an area and have organized ideas and concepts within those boundaries. In education, there are a number of cognitive taxonomies (Bloom, 1956; Gagné, 1977; Gerlach & Sullivan, 1967; Guilford, 1967) and several affective taxonomies (Brandhorst, 1978; Gephart & Ingle, 1976; Krathwohl *et al.*, 1964). In the cognitive domain, the taxonomies of Bloom (1956) and Gagné (1977) are perhaps the best known; in the affective domain, the taxonomy proposed by Krathwohl *et al.*, (1964) is best known.

The three best-known taxonomies provide a classification of learning outcomes and a way to generate and classify test items, but only the taxonomy by Gagné (1977) is sufficiently embellished to assist a teacher or instructional designer in planning and developing optimal methods of instruction. Other taxonomies, such as the one by Gephart and Ingle (1976) of the affective domain, provide lists of categories, terms, or types of responses, but do not delineate specific ways to generate test items and lesson designs for each type of outcome desired.

Taxonomies of different types serve different purposes. We have labelled them as *prescriptive* or *descriptive* in much the same way that Reigeluth (1983b) has differentiated between prescriptive and

descriptive theories. A prescriptive taxonomy includes not only learning outcomes, but also is specific enough that test items and optimal methods of instruction can be derived from it. Only the taxonomy by Gagné (1977) can be said to be truly prescriptive. The affective taxonomy by Gephart and Ingle is on the other end of the spectrum; it provides only a categorization of types of responses, e.g., visceral, emotional, but does not give clear, operational outcomes, nor does it include sufficient information to develop evaluation items and to design techniques, or methods and strategies. It is, however, a more inclusive taxonomy (it includes more elements of the affective domain) than the one developed by Krathwohl *et al.*, and hence is useful in a *different* way, e.g., to check the scope of instructional planning (but not the design of lessons).

We believe this difference between prescriptive and descriptive taxonomies is important for two reasons. First, when beginning to develop a theory of instruction, the more prescriptive the taxonomy the more useful the theory will be to others who wish to use it to design instruction. Second, prescriptive taxonomies classify educational outcomes or behaviors rather than instructional means or methods. In the affective domain, this difference between ends and means is often unclear. For example, is motivation an outcome to be planned for and evaluated (and, therefore, included in a taxonomy) or is motivation a strategy, a means to an end? If it is a means, does it belong in a taxonomy? The next two sections will shed some light on this issue.

Means vs. Ends

In planning instruction it is important to attend to the ends (goals) first, then to the means (teaching strategies). In practice, the distinction between means and ends is a sticky one and often not very clear. It is, however, an important distinction, especially when developing a taxonomy, theory, or lesson plan. When dealing with instruction for the affective domain, there is often a general hesitancy to state affective goals or outcomes. In part, this may be due to the educator's fear that she/he is indoctrinating learners, or that goal setting in the realm of values and attitudes is unethical,

or that stating affective goals is out of the jurisdiction of the instructor's role or the instructional setting. Therefore, strategies or means are stated, leaving a specific outcome undefined. We believe it is important to distinguish between affective outcomes and affective means, leaving the choice of whether or not to state affective outcomes to each designer of instruction.

The distinction we make is conceptually simple. *Means* refer to learning environments and educational activities and strategies that *facilitate* acquisition of an affective behavior. Some examples include discussion groups, value clarification exercises, role playing situations, and a variety of types of media. The emphasis in a learning activity is on what is occurring *during the activity* rather than what outcome it leads to. While objectives are often stated for learning activities, they generally explain what will take place *during* the activity; e.g., the learner will share his or her feelings; the learner will participate in a discussion about his or her values.

Affective *ends* or outcomes refer to behavior changes expected to occur as a *result* of engaging in activities. Therefore, an instructor may state an outcome, such as, "The student will demonstrate a commitment to maintaining good health." The instructor would then arrange for relevant activities (to occur over a period of time) as well as establish a pleasant environment that would influence that outcome. The purpose of the *outcome* is to focus on what result is expected, such as a commitment to good health, demonstrated by decisions made. The *means* used to help learners achieve the outcome might include a trip to the health museum, watching films, or participating in group discussions.

This distinction is not always easy to make, but it is important to keep in mind for two reasons. First, it is ends or outcomes, not means, that are most often categorized in domain taxonomies. These categories of learner behaviors can be influenced and are intended to be influenced by educational activities and strategies. The categories we give in some later chapters are outcomes; in other chapters, on sequencing and lesson design, we will deal also with means.

Second, an outcome implies evaluation. If an outcome is specified, presumably there is some way to evaluate whether the learner did or did not achieve that outcome. For affective

behaviors, evaluation can take the form of questionnaires, interviews, self-reporting strategies, and behavior observations. Usually, evaluation is conducted at a time after the activities have been employed that were intended to facilitate the behavior change. However, the same measurement techniques can be used to evaluate both ends and means. An instructor can, on one hand, evaluate the success of a particular learning activity (a means) to determine whether or not the learners participated, if they were motivated, or whether or not they enjoyed the activity; on the other hand, and often at a later date, the instructor can use similar measurement techniques to determine whether the activity led to some prespecified goal or end.

Curricular and Instructional Spirals

Affective outcomes often take a long time to establish, and regular classroom time allocations often restrict their development. The development of a value or a value system is an example of this. Values, defined as a group of inclusive attitudes, do take considerable time to develop. A two day workshop or even a semester course may not be sufficient to establish a value. If that is the case, what recourse do educators have if they wish to influence important affective outcomes?

We have relied on the use of *curricular and instructional spirals* to aid in solving this problem. What we mean by this is that a designer can (a) use the affective goal of one lesson or unit as the necessary prerequisite and building block for the achievement of an affective or cognitive goal of another lesson or unit; or (b) the result of a strategy used in one lesson or unit can become the outcome of a future lesson or unit. For example, if the goal of a unit is development of a commitment to excellent personal health (a value), the outcomes of particular lessons or units may involve commitment to developing good eating habits (an attitude), commitment to developing a personal physical fitness program (an attitude), and commitment to avoid taking drugs (an attitude). In our example, the three attitudes plus several cognitive objectives can be developed prior to attempting to develop the value, since these attitudes are contained within the value structure. As

another example, a lesson that was particularly successful in motivating learners to action may be the precipitating influence for stating a new outcome, and may also become the input for further developing motivated learners in another lesson or unit.

This idea of spirals is not new; it is basically the same strategy used with cognitive behaviors. It is a backward chaining approach where the outcome or behavior of one lesson becomes the necessary input or antecedent for the achievement of a higher level, more inclusive, outcome. These outcomes can be planned or unplanned; they build on one another, and, over time, they have some significant impact on affective behaviors that are long range and at first glance seemingly difficult, if not impossible, to influence. This spiralling can occur at the stages of either lesson-design, unit-design, curriculum-design, or even at the stage of design of life-long learning. We will have more to say about this in Part III of this book, where we illustrate how to develop an "audit trail" consisting of many objectives that operate over time in a cumulative fashion to permit achievement of life-long goals and objectives.

Summary of the Affective Domain

This section has been devoted almost exclusively to a discussion of the affective domain and some of the problems associated with it. This may seem odd since the topic of this book is *integration* of the affective and cognitive domains. However, the task of integration is impossible without some clearer and firmer notion of what the affective domain is and how to influence affective behaviors. In this section, we have, therefore, begun to delineate its parameters and its problems to give the reader some insights into the task we have attempted. As the affective domain becomes clearer, as we hope it will in this book, our task of integrating the domains will be possible.

APPROACHES TO INTEGRATING THE AFFECTIVE AND COGNITIVE DOMAINS

There is a wide variety of ways that could be used to study and

integrate the affective and cognitive domains. Not only could one approach integration from any one of several broad frameworks, like philosophy, psychology, biology, and religion, but also from perspectives that cross a number of these frameworks. As an example, one might integrate a mystical and a rational/scientific orientation, using ideas from philosophy, psychology, biology, and religion. Still another way might be to approach integration from a physiological/psychological orientation by studying brain dominance patterns; i.e., the affective right hemisphere and the cognitive left hemisphere. Other orientations might be to study particular content areas, such as art or music, that have strong affective and cognitive components.

Within a discipline such as psychology, educators with varying perspectives could, and probably would, approach the task of integrating the domains differently. Psychologists or educators could address the different orientations of a "whole person" versus a "school outcomes" versus a "learning environment" approach. These could be further differentiated along "developmental," "behavioral," and "cognitive" theory orientations. Although the list of possible approaches is not infinite, it is certainly large.

The theory approach we have used is eclectic. We have not limited ourselves to any particular philosophical or psychological theory or orientation. We have used the ideas, instructional and learning theories, and models of teaching that come from all of the following psychology and education research traditions: social, behavioral, cognitive, developmental, and humanist.

Our technique for designing instruction, however, comes from the framework of instructional systems theory. As such, we describe and discuss various ways of setting goals and objectives in the two domains and how to integrate them. We also demonstrate how to sequence instruction for the objectives that have been identified, and we show how lessons can be designed that simultaneously influence the achievement of both affective and cognitive behaviors. We, therefore, support the notion of systematically designed instruction. Following the lead of Gagné (1977) and Gagné and Briggs (1979), we utilize the major concepts of (a) a taxonomy of outcomes, (b) a sequencing strategy, and (c) a

lesson design model for working toward the integration of instruction in the affective and cognitive domains. We have already discussed taxonomies; we now give an overview of the other two components, sequencing and lesson design.

Sequencing of Instruction

An important aspect of designing instruction is the determination of how to sequence instruction for the objectives that have been identified. When the objectives consist of *intellectual skills* (a part of the cognitive domain), the analysis of the subskills into the form of a learning *hierarchy* (Gagné, 1977) is an important aid for sequencing those objectives. However, it still remains to be decided how the intellectual skill objectives are to be sequenced in relation to *information* objectives (another part of the cognitive domain), and in relation to objectives in the affective domain. To assist in this larger aspect of sequencing, Briggs and Wager (1981) demonstrated the use of instructional curriculum maps (ICMs). While Briggs and Wager presented general suggestions on how objectives may be sequenced to enhance domain interactions in terms of how learning in one domain facilitates learning in another, our purpose is to make this step in instructional design more explicit and concrete. Our notion of an audit trail of curricular and instructional spirals will also be made more explicit in Part III of this book. We therefore later present illustrations of sequences designed to maximize the contributions of each domain (affective and cognitive) to learning in the other domain. At the same time, our illustrative audit trails show how to close the present gap between broad statements of life-long needs and goals and the sequence of instruction within the curriculum.

Lesson Design

According to the approach outlined in this book, after the sequencing of objectives in the cognitive and affective domains has been determined, individual lessons are designed to achieve the objectives. Here, again, we build upon the pioneering work of Gagné (1977), who demonstrated how lessons, particularly in the

cognitive domain, may be organized around the accomplishment of nine *instructional events*. Examples of how these nine events for the cognitive domain are used in lesson design are found in Gagné and Briggs (1979), Briggs (1977), Briggs (1970), and Briggs and Wager (1981). One purpose of this book is to re-examine the applicability of those nine instructional events to affective outcomes, and to the integration of affective and cognitive outcomes.

Important guidelines for how to accomplish the nine instructional events for each of various subcategories of the cognitive domain, and for the subcategory of attitudes (in the affective domain) have also been presented by Gagné (1977) in the form of *conditions of learning*. These *conditions*, unlike the nine instructional events, are *different* for each type of learning outcome. Throughout this book we search out further conditions of learning for the affective domain, since Gagné restricted his affective conditions to the learning of attitudes and to the single method of human modeling as a way to establish attitudes.

There are few examples of designing lessons for the affective domain, either in textbooks or in curriculum development, and there are still fewer examples of designs for integrating the two domains; we later provide some examples.

In later chapters, we will identify the specific subcategories of outcomes for which Gagné has identified relevant conditions of learning. In this book, we extend the conditions of learning to subcategories of the affective domain beyond the subdomain of attitudes.

SUMMARY

Prior work has contributed to our understanding of the cognitive and affective domains, *when viewed separately*. In this book, we undertake the neglected task of how the two domains interact, or may be made to interact, by how we sequence objectives and how we design lessons. In short, our task has been to develop a framework for an instructional theory that shows how to *integrate* the two domains, both conceptually and practically.

Drawing upon the work of others, especially Gagné in the cognitive domain, and Krathwohl *et al.*, in the affective domain, we offer guidelines for both practice and further research. We thus contribute to planning how to integrate instruction in the two domains, and we identify some new *conditions of learning*, especially for the affective domain. In doing so, by the use of audit trails, we also close a gap in present practice–a gap between life-long goals and the curriculum.

Chapter 2

The Broader Context of the Problem and Our Contribution Toward a Solution

THE BROADER CONTEXT OF THE PROBLEM

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SUMMARY

Chapter 2

The Broader Context of the Problem and Our Contribution Toward a Solution

In Chapter 1 we stated the problem that our knowledge of the affective and cognitive domains has been dealt with separately, by separate groups of people. The result has been that there is a lack of integration of the two domains in both research and instructional practice.

Also, in Chapter 1, we indicated that our contribution toward a solution of this problem will focus upon two primary curriculum and instructional practices: (1) the sequencing of instruction, and (2) lesson design. In the latter part of this chapter we elaborate on those two major practices, and we show their relationship to the affective domain and the cognitive domain. Before doing so, however, we pause to review broadly many influences upon learning which are beyond the scope of this book. We make this digression for several reasons: (a) to acknowledge the limitations of this book, (b) to admit that our contribution toward a solution of the problem is a modest one, (c) to emphasize the enormous complexity of the problem, and (d) to encourage others either to add to and correct our limited area of effort, or to pick up work on other areas we have only acknowledged but not worked upon.

THE BROADER CONTEXT OF THE PROBLEM

It is self-evident that many persons and influences determine what and how people learn. We have chosen only to sketch broadly here the wide range of influences upon learning which go

beyond the solution strategies treated in detail in this book. We include influences upon learning accomplished by both children and adults. As we shall see, many of these influences are exerted by people other than educators. While this book is addressed to teachers, curriculum developers, instructional designers, trainers, and materials and media developers, many influences are exerted by people other than those who have professional responsibility for instruction.

Since this book is intended for those who teach adults as well as for those who teach children, we list separately these determiners of learning for elementary and secondary school learners and for adults. There are, of course, some long-term effects which begin early in life and persist into adulthood, but for convenience we list the influences separately. We pause only for the briefest discussion of each influence, and we make no pretense of being able to defend our rank order of them in importance.

Determiners of Learning in Elementary and Secondary Schools

We have no quantitative way to appraise the relative strength of the various determiners of learning that we list here. However, our subjective estimate is that we take them up roughly in their *rank order of strength of influence upon learning*. We have no way to show the interactions among the influences, nor are we prepared to defend our subjective rank ordering. Our main purpose, as stated earlier, is to acknowledge the many influences or determiners of learning which are not included in our major concentration upon sequencing of instruction and lesson design. However, we do suggest that simply being aware of all these influences should benefit both educators and others who also influence schooling and adult education. We even hope that listing these influences will help us, the authors, to present our central contribution in a more insightful manner.

Home Environment

There can be little doubt that a home environment which encourages learning and places a high value upon it is a major factor in both the achievement of children and upon their

attitudes toward education. It is well known, for example, that children read more if their parents read more. There is a positive correlation between the amount of parental education and children's school achievement. Occupation of fathers is related to achievement of their children. Presumably, similar findings about occupations of mothers will be forthcoming.

A broad perusal of the fifth edition of the *Encyclopedia of Educational Research* (Mitzel, 1982) turns up much evidence of the influence of home environment upon children's school achievement. In fact, it is the strength of this influence which may account for the modest results of many school improvement programs. It is not that parents must be highly educated for their children to become highly educated. Rather, the need is for parents to support and encourage learning, and to be role models of life-long learning. The old custom of parents' reading books to children in the evenings may have been supplanted all too much by television watching. It may be hoped that if we are changing from an industrial society to an information society, as some claim, home influences will again be exerted to place a higher value upon learning.

Intelligence

While there have been many criticisms of standard measures of intelligence, the fact remains that the scores on such measures are positively correlated with achievement. The nature-nurture battle continues to be waged. In earlier years the controversy centered upon the relative strength of genes versus training as the determiners of intelligence. In recent years racial bias in intelligence tests and in schooling has been the focus. There are calls for tests which tap originality and creativity rather than acquired knowledge and skills. However these issues may be resolved in the future, and allowing for changes in both tests and the curriculum, we would expect intelligence, however defined and measured, to remain high among influences upon learning.

Motivation

We begin by noting that motivation can be both a cause and an effect of learning. The conventional wisdom is that motivation

causes achievement. So teachers for years have attempted to "motivate" the learner first. Recently there has been more recognition that a teacher can arrange for learning to be successful, and this success fosters further learning. This idea is operationalized in many forms of competency based instruction, in individualized instruction, and in precision teaching. In a later chapter, we will see that Keller (1983) has broken down the concept of motivation into four major aspects: interest, relevance, expectancy, and satisfaction, and he has recommended teaching strategies for each. Motivated learners and motivational materials do have a positive influence upon learning.

Public Policy

In a later chapter, we mention some of the shifts in influence of federal, state, and local government upon the curriculum of elementary and secondary schools. But public policy and legislation also extend (some would say intrude) beyond curriculum matters.

Mitchell and Encornation (1984) have pointed out that policy goals have shifted over the years. Beginning in 1920, the goal was for efficiency in the schools, but equity emerged as the primary issue from the 1950s through the 1970s. Now, in the 1980s the goal has shifted to quality. The authors go on to summarize the mechanisms that state legislatures have employed to implement policy. These mechanisms are: structural reorganization, revenue generation, resource allocation, program definition, personnel training and certification, student testing and assessment, and curriculum materials development. Thus, public policy determines access to school, the nature of the curriculum, and how teachers are certified. Public policy thus relates to who may be educated, and where, as well as to classroom grouping, curriculum, and indirectly to methods and quality of instruction.

Self-Esteem and Attribution

While self-esteem and attribution are distinct conceptually, operationally they are related. Bar-Tal (1978) defines an attribution as "the inference that an observer makes about the causes of behavior—either his own or another person's" (p. 259). One aspect

of attribution theory is "locus of control." A person who perceives outside influences as the determiners of his or her success or failure is called an "external." A person who perceives his or her own ability and effort as the determiners of success or failure is called an "internal." An internal reacts to success with increased pride, and over a period of many successes, is likely to develop positive self-esteem, other factors being equal.

Later chapters will deal in more detail with motivation and self-esteem. The point, of course, in the context of this book, is to attempt to design sequences and lessons so as to harness the power of intelligence, motivation, and self-esteem into long-term constructive learning and personality development.

Time on Task

Of all the specific variable that have been studied relating to teaching arrangements and procedures, time on task may be the most powerful. This variable, we say with some chagrin, is probably more powerful than teaching methods or quality of instructional materials. Some legislators have assumed that lengthening the school day and school year will increase achievement, presumably because time on task would be increased. However, several studies have indicated that only a small portion of each school day is spent with on-task activities. Our suggestion is to increase the interest and challenge of activities and materials, thereby increasing the amount of time learners will spend on task, and at the same time to enhance motivation and self-esteem. Present instructional design practices appear to result in relatively effective learning, but we believe this level could be improved by the use of recommendations made later in this book about sequencing and lesson design to better integrate progress in the affective and cognitive domains.

Teacher-Pupil Relationships

Earlier research has studied the effects of classroom climates named democratic, autocratic, and laissez-faire. The democratic climate has often been found to enhance pupil comfort, and sometimes achievement. If these data were re-analyzed to separate results for "internals" and "externals," this would perhaps make

the data more meaningful. Such an analysis, however, falling into the general category of research into trait-treatment interaction, or learning styles, would perhaps be hard to apply. Any research confirming different learning styles has the penalty of low efficiency when put into practice, because of the need for multiple teaching approaches for the objective. Perhaps creative programming of computers and microcomputers can help overcome this difficulty. If computers can be interactive with varying entry skills, as in present programs, perhaps they could be made to be interactive with varying personal traits such as locus of control.

The general topic of the contributions of teachers to the achievement of affective and cognitive objectives is addressed in a later chapter.

Teaching Methods and Quality of Instruction

Research in teaching methods has led several writers to conclude that any method can be effective if the teacher is comfortable with the method and pursues it with enthusiasm. This is one justification for the traditional practice of allowing great latitude to teachers in regard to method.

We are somewhat uncomfortable with the above, rather generally accepted, conclusion. First of all, some research studies or methods do not verify and document how accurately and consistently the intended method is applied. Second, many of the methods studied are not replicable; there is no guarantee that other teachers could apply it the same way, nor that a given teacher could do it the same way twice. It is difficult, therefore, to generalize about particular methods to many teachers. Third, there may be undetected trait-treatment interactions which are obscured by the data analysis method used. We therefore believe that improvements are needed in methods research, including how to relate the method to the type of outcome represented in the objectives. But as matters now stand, it may be that teaching method accounts for only five percent of achievement variance, as some have concluded.

"Quality of instruction" is also a difficult influence to address, partly because of a philosophical circular dilemma. We could define quality as adherence to specified rules in designing and

delivering the instruction, or we could define it empirically as the extent to which pupils achieve the objectives. Thus if we follow the "systematic approach" to designing the instruction, we specify and sequence objectives, and we design lessons using the appropriate instructional events and conditions of learning, such as those stated by Gagné and Briggs (1979). According to theory, if we are skilled practitioners, our instruction should be empirically effective (pupils would earn high scores in tests over the objectives). If the students do in fact score well on the tests, we have no problem. But if they don't score well, was the theory defective or was our *application* of the theory defective? Or were the students not trying to learn, or did they lack the assumed entering skills? Tough questions. It is difficult to validate a teaching theory, even if scientifically derived, when our method of instruction and the theory testing depend in part on our artistic competency. This mixture of art and science complicates the entire matter of teaching and learning, but we must try to live with it.

Aside from these problems, and by any definition of quality of instruction *presently within our state of the art*, we estimate, with chagrin, that quality of instruction must be ranked relatively low as we have it here, among other more powerful influences upon learning. *However*, if we do make progress in achieving instruction which better integrates the affective and cognitive domains, we believe we can eventually move the state of the art to a degree of quality which would push this topic higher on our list of influences upon learning. Our own part in this desired result would rest upon our handling of sequencing of objectives in the two domains, and upon our skill in identifying conditions of learning to be incorporated into lessons containing affective and cognitive objectives. If our overall approach proves to have merit, others could join in this approach to the further improvement of quality of instruction. Of course, other approaches may prove more fruitful.

Learner Strategies

We had difficulty deciding where to place learner strategies in our rank order of influences upon learning. In a broad sense, no academic learning takes place without some cooperative activity

on the part of the learner. But in a more narrow sense, we have no good basis for knowing the relative influence of learning strategies that are directly taught to the learner by the teacher and strategies developed by the learner's own efforts.

A complicating factor is that our use of "learner strategy" refers to two distinct kinds of activities, which Gagné (1977) terms, respectively, "internal conditions of learning" and "cognitive strategies." We also embrace information processing in our use of learner strategies.

Internal conditions of learning include the prior learning which the learner brings as prerequisites to a new learning task or objective. The term also includes the learner's study habits and way of attending to instruction. When we add the term "cognitive strategies," we are referring both to a process of learning and an outcome. The learner develops major sets of cognitive strategies over a lengthy period of time. Some of these strategies may be used only in a single subject, like mathematics, while others may be used for all new learning. Gagné uses this term as an outcome domain in the sense that strategies are an outcome of learning, but he also treats them as learning processes.

To further complicate matters, the term "information processing" has been adopted to identify one kind of learning theory. This theory tends to imply that all people learn by the same processing mechanisms and that all types of learning outcomes (domains) are achieved by the same process. While we agree that there are some universal characteristics of brain functioning, in the physiological sense, we regard information processing as a theory of memory rather than a theory of learning. So we regard how memory is used in practical learning situations as only one aspect of the individual learner's strategies for new learning.

However, the main reason for listing learner strategies here is to raise the question of the extent to which strategies are to be included in instruction and the extent to which the learner is left to devise his or her own strategies.

Derry (1984) has proposed to directly teach some learning strategies before the lesson content is presented, and then program the computer to help the learner recall the strategies when learning problems are encountered.

Again, working to enhance motivation and self-confidence, coupled with learner strategy instruction, could represent an improvement in the state of the art in instructional practice.

Attitudes and Values

We would tend to place this topic higher in our rank order of influences in the broad sense that little school learning would take place in the event of completely negative attitudes and values concerning learning and schooling. Yet, because little is done explicitly to influence attitudes and values in instructional situations, we have placed it here.

Also, as for other topics in this list, we consider attitudes and values as both inputs to learning and outcomes of learning. Just as motivation is a pre-determiner and a result of successful learning, so are attitudes and values. As we delve into the role of attitudes in later chapters, we will recognize increasingly the interactions among many of these influences upon learning in our present list.

Peer Influences

As children mature, the relative influence of various "significant others" in their lives changes. The parents are all-important in infancy and early childhood, and then peers begin an influence which increases with time.

Beyond this simple observation, we might just remind readers to think to recall from their experiences the appearance of influence from other persons, such as teachers, spouses, supervisors, public figures, and others.

Instructional Media

We have deliberately used the term *instructional* media because we have nothing to offer concerning the debate over the good or evil of commercial television. We do not deny the power of commercial television—we just wish it were used more for instructional purposes for goals toward which our personal biases predispose us. That said, we refer now to media used in schools and training institutions.

There have been several "models of media selection," for use in education and training. These have been reviewed by Reiser and

Gagné (1983), who have also offered their own model, which attends to consideration of characteristics of the learners, the nature of the objectives, and principles of learning.

Short of outright inappropriate selection of media, such as audio recordings for the deaf or conventional print for the blind or the non-reader, there are few generalizations to be drawn from research that compares the effectiveness of one medium with that of another. Our conclusion is that *the message is more important than the medium.* That is to say, we believe that careful design of the software is the key to instructional effectiveness. If, for example, one adopts the model of lesson design proposed by Gagné and Briggs (1979), one would select media or combinations of media which permit the presentation of each of the nine "instructional events" called for in that model of lesson design. These nine events are discussed later in this book. In that model, the teacher is considered a medium, so any of the nine instructional events may be provided for by either the teacher or by other media. It has been shown that this model can be applied either by teachers (Briggs, 1977, Chapter 8) or by teams of instructional developers (Carey & Briggs, 1977).

However, to accomplish the instructional events in such a way as to adjust to learner differences, an *adaptive* medium may often be preferred. A later chapter will deal with media in the context of the purpose of this book.

In conclusion, while we rank media selection low in relative influence in the present state of the art, we foresee more creative uses of media not only to adapt to varying entry skills but also to affective characteristics of the learner. Eventually, more creative design of software should move this topic much higher in our list of influences upon learning.

Determiners of Learning for Adults

In the previous section of this chapter, we have listed determiners of learning in elementary and secondary schools. Many of these determiners or influences pertain also to adult learning, and perhaps the relative strength of influences shifts somewhat over the years.

We now list *additional influences* pertaining to *adult learning.*

Personal Goals

While many determiners of learning in childhood, such as intelligence, motivation, and self-esteem, may continue as powerful determiners of adult learning, the personal goals of the adult begin to become clarified and to exert greater influence. These goals are manifested in decisions, such as whether to enter college or the world of work. Of course, some may attend college primarily for social reasons, but others enter with serious interests which prove to be permanent. Needless to say, the school or work decision reflects the prior attitudes, values, and achievement of the person. For college students, the choice of a major may be directly linked to a life-long occupational or professional goal. Also in early adulthood, the goals relating to work, marriage, and long-term material security may conflict, and only gradually be resolved into a life pattern. The decisions made in this process, in turn, will partly determine the persons who are to become significant others—spouses, colleagues, bosses, employing organizations, etc. Separate chapters in this book deal further with adult learning in undergraduate school, professional schools, and military and industrial organizations.

Organizational Policies

For adults not entering professions through professional schools, policies of employing organizations may be closely related to continued learning and career progression. Company policy may determine whether any career progression is possible, and if so, the mechanism for progression, e.g., experience, training, or a combination of both. Further formal training or education thus may be closely linked to career plans. Training in some organizations may be of short duration and narrow in scope, while other organizations may provide a life-long sequence of job progression interspersed with increasingly broad or specialized training. Some organizations operate their own schools, and others sponsor advanced university education.

While most employing organizations are involved in training and education now, the scope of this may expand because of shifts in demand for various occupations. There have been several forecasts by many publication sources of the nature of these shifts in job

demands. While forecasting the future is an uncertain enterprise, young people would do well to study the forecasts. The majority of futurists believe that we can at least devise alternate scenarios of the future showing what results could be expected from alternate national policy decisions yet to be made. Notice could be taken by adults of the occupational implications of some of the forecast material.

Expectations of the Future

Many young people are understandably doubtful whether it is worthwhile to plan for the future. The complexity and seriousness of world and national problems can indeed lead to pessimism. Some futurists are pessimistic and some are optimistic, but both camps agree that if the right decisions are made, the problems can be solved. Hawkin, Ogilvy, and Schwartz (1982) point out that a prospect of doom can paralyze action just as certainly as naive hopes render action unnecessary. They outline seven plausible scenarios, based on a program of research at Stanford Research Institute. While the major problems they cite—depletion of energy resources, hunger, erratic weather, and threat of nuclear war—are not strictly educational or occupational matters, the education of all citizens is a needed step toward increasing the probability that the necessary decisions will be made. The implication: a more broadly educated citizenry is needed to select political leaders.

Life Styles

We use the term "life styles" in a broad sense. We do not refer to sexual preferences or living arrangements, but to overall adult goals. Mitchell (1983) conducted a major mail survey of over 800 specific questions to a sample of over 1,600 American adults aged 18 and over, living in the 48 contiguous states. The data were analyzed into a typology which "comprises four comprehensive groups that are subdivided into nine life styles, each intended to describe a unique way of life defined by its distinctive array of values, drives, beliefs, needs, dreams, and special points of view:

Need-Driven Groups
  Survivor Life style
  Sustainer Life style

Outer-Directed Groups
  Belonger Life style
  Emulator Life style
  Achiever Life style
Inner-Directed Groups
  I-Am-Me Life style
  Experiential Life style
  Societally Conscious Life style
Combined Outer and Inner-Directed Groups
  Integrated Life style (pp. 3-4).

Mitchell goes on to say that some adults stay fixed in one lifestyle while others move from one style to another over a period of their adult years. The causes of such progression are very complex. Mitchell lists these influences as determiners of status and degree and nature of change: events and circumstances, age, history, unresolved childhood and other experiences, changing paradigms, natural development, and evolution. It is clear that learning of either an incidental sort or a planned learning course must play a large role in the directions in which a person moves over the years. As some persons gain everyday experiences, they review goals and aspirations and deliberately plan changes in their lives, some of which may require formal education or training for realization of the planned change. Other persons appear to just drift along on the same level. Also, some individuals seem almost to "inherit" their place in the scheme from parent status, while others actively seek change of status. We must suppose that such planned changes often create a market for further education and training services. Other changes may relate to occupational shifts not requiring further training or retraining.

Feelings and Emotions

This influence could have been listed under either childhood or adult influences upon learning. We often think of feelings and emotions as *reactions* to experiences, including educational experiences, but recent literature suggests that feelings and emotions are *determiners* of what the person seeks to learn. Like motivation and attitudes, feelings and emotions can be both determiners and consequences of learning. We will look briefly into this literature in a later chapter.

Summary of Influences Upon Learning

We have named and briefly discussed a great variety of influences upon learning by both children and adults. We have done this partly to present a condensed overview of many influences which are not addressed in detail in this book. This helps to set the broader context within which rest the curricular and instructional techniques which are the main focus of this book. We also hope this will indicate to the reader that we, the authors, are not narrow specialists in our total view, even though we concentrate the major portion of this book upon a few aspects of curriculum and instruction, and even though we are professionally identified as instructional designers applying a systems approach to instruction.

Having reviewed this broader context of many influences upon learning, we next turn to an overview of the research and techniques which will be emphasized most in the remainder of this book.

OUR CONTRIBUTION TOWARD A SOLUTION

In the opening portion of this chapter we gave an overview of the broad context of total influences upon learning within which our contribution toward a solution to the problem of domain interactions will be developed in this book. We now take a similar broad view of the total scope of planning a curriculum or course of study before outlining the components of our approach to instruction to integrate the domains.

An Overview of Curriculum and Instruction

Whether one is planning an entire school curriculum or designing a single course or special training program, a useful check on the total plan is to see if the following questions are answered in the plan: Who? What? Why? When? Where? How? We now address each question in turn.

Who

The people who are to be taught and the people who are to do

the teaching must receive deliberate attention. The characteristics of the intended learners should be noted systematically so that the instruction is planned to meet their needs through application of teaching means which are appropriate for them. This information about the learners may come from school records, test data, or personal contact with the learners. The instruction is then designed so as to match the characteristics of the learners both as to the ends to be sought (goals, outcomes) and the means to be employed (methods and materials for learning).

The characteristics of the teachers or trainers also must be considered to be sure that *their* characteristics are compatible with the ends and means that are adopted. The skills and attitudes of the instructors, as well as their knowledge of subject matter, need to be matched to the ends and means to be selected. The instructors' knowledge of student characteristics is also widely recognized as crucial.

What

What is to be taught is expressed in the form of the goals and objectives of the instruction. Objectives may be specified at several levels: lesson objectives, unit objectives, course objectives, or curriculum objectives. Sometimes the objectives are expressed in the form of "instructional curriculum maps" (ICMs) which list objectives in the cognitive and affective domains (Briggs and Wager, 1981). For the sub-domain of intellectual skills, the development of learning hierarchies (Gagné, 1977) is useful. Or, objectives may simply be listed in a descending order of complexity, as in our example of audit trails in Part III of this book.

The practice of listing intended objectives does not prohibit the emergence of unanticipated outcomes, as many have claimed. We see no reason why a teacher cannot work with preplanned objectives as well as respond flexibly to unexpected outcomes.

Why

The detailed objectives adapted for a curriculum or a course must be justifiable by reference to some long-term outcomes, such as life-long goals. This matter is dealt with for both education and

training in Part III of this book. Thus objectives for each lesson, unit, and course must contribute to the attainment of some longer-term goal. A mechanism for plotting such linkages between groups of detailed objectives and broader goals is presented in our illustrative audit trails in Part III.

When

For public education at the elementary and secondary level, laws determine when children enter school and how long they must remain. But the matter of just when specific objectives should be taught is left largely up to the schools and the curriculum planners. The question of "when" is not a trivial one. The development of the child as well as sequencing considerations enter into good planning for when each cognitive or affective objective may be undertaken.

For adults, there is more flexibility as to when education is continued or special training begun. This is taken up in Part III.

Where

Again, for children in public schools, where they attend is determined by law and local rules. The major determiner is place of residence. Race may no longer place some children in inferior schools, nor may all exceptional children be segregated from other children.

For adults, choosing the locus of further education or training is often related to career plans, as discussed in Part III.

How

This refers to the methods, media, and techniques of teaching, or the means. Much of this book is devoted to background and techniques relating to the planning of sequences of lessons for objectives in the affective and cognitive domains.

The Major Components in Our Approach

We have gone to some length, in the opening section of this chapter, to discuss the broader context within which our contribution to the solution of the identified problem is em-

bedded. As said before, we hoped that doing so would help us, the authors, to retain a broad perspective when presenting the details of our work. We also hoped that this broader context would help the reader evaluate our contribution, and to decide whether to employ it in practice or research.

We have chosen in this book to classify the details of our work in accordance with the following outline of components in our approach to building a theory for the integration of instruction for affective and cognitive goals:

1. Needs Assessment (Audit Trails)
2. Taxonomies of Outcomes
3. Sequencing of Instruction
4. Lesson Design
   a. Objectives
   b. Instructional events
   c. Internal conditions of learning
   d. External conditions of learning
   e. Learning materials, activities, and media
   f. Evaluation

The following sections of this chapter represents an overview and introduction to the components in the above outline. All these components will be encountered in more detail later in this book.

Needs Assessment (Audit Trail)

Robert Mager has said "if you don't know where you are going, no telling where you will end up." This was a way of saying that we should be sure of our intended goals (ends) before we decide how to reach them (means). Another way of expressing the same idea is "don't bother about solutions before you have a problem."

These ideas have been expressed more formally and in considerable detail by Kaufman and English (1979) in their treatment of methods of needs assessment and needs analysis.

In Part III of this book, we present the technique of "audit trails" as our way of approaching needs assessment. An audit trail represents an attempt to not only identify life-long goals, but also to design curricula and courses by listing a continuous sequence of objectives from elementary school to adult life. In Part III we

discuss what we believe is a major problem in present practices in curriculum and instruction—the separation of responsibility for (a) long-term goals (needs), (b) intermediate goals (curriculum), and (c) short-term goals (instruction day by day). This separation, in combination with the separation of the cognitive and affective domains as discussed in Chapter 1, becomes the "problem" that we address.

An audit trail not only seeks to bring continuity among lesson objectives, course objectives, curriculum goals, and life-long goals, but it also seeks to bring integration of affective and cognitive objectives. The example audit trails in Part III encourage us to believe that a more thorough effort in this direction would improve both curriculum and instruction. More broadly yet, we see the audit trail as a potential mechanism for coordinating the work entailed in needs assessment, curriculum development, and the sequencing of instruction.

Taxonomies of Outcomes

This topic is treated in detail in Chapter 3. Here we will merely list and briefly discuss several uses of taxonomies, as they relate to the design of instruction.

Checking audit trails for completeness. When a first draft audit trail has been developed, the individual objectives in it can be classified, using a taxonomy for the cognitive domain and a taxonomy for the affective domain. Doing this will reveal gaps or empty taxonomy categories. We can then review the audit trail to determine whether some of the gaps should be filled, by adding new objectives. This process is a systematic way to check our objectives for balance, breadth, and completeness. It will remind us to review the sequencing of objectives to enhance domain interactions—the contribution of affective learning to cognitive learning, and the reverse.

Checking lesson design. As discussed elsewhere in this book, the classification of each objective into a taxonomy category can remind us to review lesson plans to see if they incorporate appropriate conditions of learning. As shown in Chapter 1, we must consider two kinds of conditions of learning when designing lessons: (a) internal conditions, reflecting presence or absence of

essential prerequisites for the lesson, and (b) external conditions to be provided by the teacher or by the lesson materials. Since the external conditions are different for each category in a taxonomy, classifying the objective reminds us to recall or look up the appropriate external conditions of learning.

In a later chapter, we list these external conditions; many of them, especially for the cognitive domain, were originated by Gagné (1977). Most of the conditions for the affective domain were identified by the authors. Referring to these lists of conditions frequently when designing lessons is recommended.

A large amount of our effort in preparing to write this book was to make inferences from the research literature concerning the affective domain in order to originate new conditions of learning.

Interpreting learning research literature. For the designer who attempts to apply the learning research literature, a taxonomy is useful to classify the category of learning outcomes represented in each research report. From the researcher's point of view, a taxonomy helps to identify the boundaries of outcomes within which the research can be generalized. One of the confusing problems about the learning research literature is that there is no clear general agreement on what the category labels in taxonomies mean. Thus the reader of the reports may have to search the article for objectives and test items in order to infer the category of outcomes represented by the research study.

Planning evaluation instruments. The classification of objectives into a taxonomy is a helpful guide to the development of tests measuring achievement. Briggs and Wager (1981) have offered concrete guides to developing such tests, using the standard verbs for each taxonomy category listed by Gagné and Briggs (1979). Some additional standard verbs are implied by the taxonomy of the affective domain by Krathwohl *et al.* (1964). These listings have aided the authors in developing both conditions of learning and standard verbs for the affective domain.

As shown in Chapter 1, achievement tests have two distinct values for the teacher and other designers of instruction. First, they can be used to evaluate and improve the lessons and the materials (formative evaluation), and second, they can be used to evaluate revised lessons and to assess the achievement of the students (summative evaluation).

Sequencing of Instruction

The above discussion of needs assessment and audit trails has conveyed much of what we wish to say here about the sequencing of instruction.

The major remaining point is that a re-examination of our audit trails and lesson plans can alert us to a continuous consideration of how to interface cognitive and affective objectives. So there is the question of how to sequence objectives *within* each domain and *between* the two domains. Learning hierarchies can help decide sequencing within the intellectual skills sub-domain of the cognitive domain. Instructional curriculum maps represent a visual display to help us make and review decisions about sequencing between the domains, and within domains other than the intellectual skills subdomain.

The reader may wish to inspect the audit trails in Part III and decide whether some improvement upon the sequencing could be made.

Lesson Design

We adopt a basic approach to lesson design first developed by Gagné (1977), and elaborated upon and further illustrated by Gagné and Briggs (1979), Briggs (1977), and Briggs and Wager (1981).

These references contain some format aids useful in designing lessons. Here we will briefly discuss the following components of this approach to lesson design:

1. Objectives.
2. Instructional events.
3. External conditions of learning.
4. Materials, activities, and media.
5. Evaluation.

Objectives. Using the audit trail as a guide, the designer identifies lessons and series of lessons to implement the portion of the audit trail for which he or she is responsible. Each lesson may have one or more objectives in either the affective or cognitive domain, or both. The objective(s) is noted by the designer to guide the lesson design work, and in our model, the objective is also communicated to the learner unless there is a reason for not doing so, as is often the case with affective objectives.

Selecting instructional events. Gagné (1977) has identified nine instructional events which are the building blocks in this model of instructional design. These nine events are listed, discussed, and illustrated in the several texts referred to in the opening portion of this chapter section on *lesson design*. Those same texts also present examples of lesson designs. Most of the sample lesson designs in those texts and most of the known applications in design projects are for objectives in the cognitive domain. One task we face later in this book is to examine the relevance of those nine events for affective objectives.

One purpose of lesson design is to decide which of the nine events are necessary, considering the sophistication of the learner in providing his own events. For some learners and some lessons, only a few of the events may be provided by the teacher or by the instructional materials, media, and activities. For other learners and other lessons, all the events may be presented one or more times during a lesson.

The nine events, as listed by Gagné and Briggs (1979, p. 157) are:

1. Gaining attention.
2. Informing the learner of the objective.
3. Stimulating recall of prerequisite learning.
4. Presenting the stimulus material.
5. Providing "learning guidance."
6. Eliciting the performance.
7. Providing feedback about performance correctness.
8. Assessing the performance.
9. Enhancing retention and transfer.

Each of these events is intended to activate internal information-processing activities, one of the components of the *internal events of instruction*.

After the designer decides which of the nine events are needed for a lesson, the next step is to decide how to implement the events chosen. This implementation involves (a) a plan to incorporate the relevant external conditions of learning into the events of the lesson, and (b) the design and development of the physical materials or communications and learner activities needed to accomplish the events. These two aspects of implementation are addressed next.

The external conditions of learning. Whereas the nine events of instruction listed above are presumed to be applicable for all learners and all types of desired outcomes, the conditions of learning are different for each category of outcome in taxonomies. That is to say, the matter of what is communicated to the learner and how it is communicated during instruction vary according to the type of outcome represented by the lesson objective. This variation among lessons representing different outcome categories tends to occur for two of the nine events: presenting the stimulus and providing guidance to learning.

In regard to presenting the stimulus, *what* is presented and *how* it is presented varies with the category of intended outcome. For example, in the memorization type of objectives, the instructor presents the exact words to be remembered and recited by the learner, as in memorizing a poem or a set of words and their associated symbols, as in mathematics. On the other hand, in teaching a rule, such as how to find the area of a circle, the teacher states the rule and demonstrates examples of applying the rule, but the learners are not asked to reproduce solutions to the same examples, rather the solution to *different* examples.

In regard to guiding learning, in the case of memorizing a poem, the teacher directly prompts the learner by giving the next line of the poem when the student is blocked in reciting at a particular point. But when learners are trying to find the area of a particular circle, the teacher would give indirect hints when needed, such as "what is the value of pi?" or "what is the relationship between diameter and radius?"

Stated differently, two external conditions of learning for memorized material are to present the exact stimulus material to be learned, and to provide direct prompts. The external conditions for learning to apply rules are to provide a variety of sample solutions and give indirect hints when a learner falters when trying to work a new example.

A summary of the external conditions of learning to be incorporated into the events of instruction for different types of outcomes is presented in Part IV of this book.

So the nine events or building blocks are the same for all lessons, but the conditions of learning incorporated into the events

vary among lessons, depending upon the type of outcome reflected in the lesson objective.

Designing materials and activities. In some lessons, all the events of instruction are accomplished by the teacher and by learners' responses to the teacher. In other lessons, several media may be employed to accomplish the nine events. Selection of a medium for each instructional event can bring a precision to teaching which may be lacking in a less analytic method of lesson planning. When it has been decided which medium will be used for each event, then the actual lectures, discussions, activities, and materials and media can be planned in a word-by-word, picture-by-picture, and action-by-action level of detail, as in writing a script. Often the first brief outline of how each event will be accomplished is called a "prescription," and the full-scale verbatim presentation for the event is called a "script." See Briggs and Wager (1981) for examples of prescriptions and scripts.

Evaluation. The lessons first designed can be empirically evaluated by the process called formative evaluation, which includes giving a test after the lesson and making an item analysis of the results. Formative evaluation can also involve other procedures, as outlined by Dick (1977a). The total purpose is to improve the instruction before the next use of the lesson designs, and to have a preliminary estimate of how well the instruction is succeeding in enabling the learners to reach the objectives.

After instruction has been revised by the above procedure, a summative evaluation can be undertaken (Dick, 1977b) to (a) assess the effectiveness of instruction in achieving the objectives, (b) to detect unplanned outcomes, and (c) to make decisions as to whether to keep the program or to adopt a different one.

The two evaluation stages just discussed have been widely used for cognitive objectives. The evaluation of progress for affective objectives will receive attention later in this book.

SUMMARY

In this chapter we have presented a broad outline of the many pre-determiners or influences upon learning in order to set the total context of this book.

We then presented a brief overview of questions to be answered by design of curricula and courses in education and training.

Within these two general contexts, we sketched out the major components in our approach to the problem of how to integrate instruction in the affective and cognitive domains. In so doing, we identified some well-established practices in designing instruction for the cognitive domain, and we alluded to new elements we have added for the affective domain and for integration of the two domains.

We expressed the hope that preparing this chapter would help the authors keep aware of the broader context within which we are seeking solutions to the problem we have addressed. We also expressed the hope that these overviews would help prepare readers for the remaining chapters, and would lead them to realize that we are aware of many facets of the problem which we could not address in this book.

We are sobered by the complexity of the task we have undertaken, and we acknowledge that we have made only a modest beginning to the solution of the problem we have addressed.

We have identified our professional affiliation with that not completely popular group called "instructional system designers" or "educational technologists." Whatever the previous views of the readers concerning that group may be, we hope this chapter has convinced you that we are not just narrow technicians. After you have finished reading the book, we would not be displeased if you would regard us as "humanistic instructional technologists."

In any event, we hope this book adds a new dimension to instructional technology. We are confident that we have identified an important problem. How well we have dealt with it we leave to your judgment.

Introduction to Part II: The Research Background and Instructional Implications

In Part II of this book we present the research background that we used for deriving instructional implications for integrating the affective and cognitive domains. We also present internal and external conditions of learning for each component of the affective domain that we discuss. Before proceeding to describe the contents of Part II, we first want to offer a working definition of the affective domain.

In Chapter 1, we provided a general overview of the affective domain, and we listed some problems that we and other researchers have encountered when trying to define and make use of the affective domain. We did not, however, provide a clear, concise definition of the domain. Rather, we reported terms and constructs that have been used in descriptions of the affective domain, or terms and constructs that are included in taxonomies of the affective domain. Granted, this is not a satisfactory definition. We attempt to rectify that here.

In general, the affective domain is comprised of all behaviors concerned with emotions and feelings. Ringness (1975) defines the affective domain in the following way: "Strictly speaking, any behavior that has an emotional tone lies within the affective domain, which is why emotions themselves belong to it. Some behaviors have a more highly cognitive component than emotions, per se, yet also have a definite emotional tone. Thus, interests, tastes, preferences, attitudes, values, morals, character, and personality adjustment are important parts of the affective domain" (pp. 19-20).

Gephart and Ingle (1976) spent considerable space in their paper trying to define the affective domain; they never do present *one* definition, but instead give several. They also offer a number of ways *not* to define the domain. They say, "The affective domain is an abstract categorical term which references a class of concepts. As such, it has no synonyms" (p. 186). They go on to say that the affective domain is at a higher level of abstraction than either a term like emotion, or one like affect. "The affective domain is the term for the whole class and as such is the most abstract concept in the taxonomy" (p. 187). In addition, they point out that the three domains, cognitive, affective, and psychomotor, are "three useful explanatory fictions" because we never "see 'pure' affective behavior or 'pure' cognitive behaviors, etc." (p. 186). Their "definition" is, in part, the terminology they include in their taxonomy. We present their taxonomy in Chapter 3.

We used the definition of Ringness (1975) and those given by Gephart and Ingle (1976) to help us formulate our own definition of the affective domain. Since there are no pure behaviors, and because of our interest in integrating the affective and cognitive domains for instructional purposes, we have used a working definition that combines the affective and cognitive aspects of any behavior. We were interested in behaviors that had a strong emotional tone coupled with a cognitive capability.

The definition that guided our work is: The affective domain is a category term which catalogs a class of *behaviors that have both an emotional tone and a cognitive component; both components are required for expression of the behavior.* Like Gephart and Ingle, we (a) use the term affective domain as a superordinate category, and (b) use the components we included in the domain to assist us in understanding and defining the domain.

In Part II of this book we provide examples of how other people have defined the affective domain, and we provide a number of constructs that can be included in the domain. We do not believe we have exhausted all the possible components that could be included, nor are we convinced that all the constructs we have included should be included, e.g., social development and attributions. So, by our working definition and our inclusion of

the constructs found in Part II, we present a first stab at forming some boundaries for the affective domain.

We begin Part II with a chapter on domain taxonomies. In Chapter 3, we present an overview of several taxonomies of the cognitive domain and several taxonomies of the affective domain. These taxonomies "define" or set boundaries for each respective domain. We attempt to compare the taxonomies within a domain, and we offer a critique of the major ones. We end the chapter with a brief summary of research that has attempted to integrate the affective and cognitive domains.

In the remaining chapters of Part II, Chapters 4 through 7, we examine individual components of the affective domain. We close each chapter with the internal and external conditions of learning that we derived for each component. Following the convention from the cognitive domain established by Gagné (1977) and Gagné and Briggs (1979) we adopt the notion of "conditions of learning." We have included both *internal* and *external conditions of learning*. The internal conditions refer broadly to the conditions that must be present in the learner before learning can occur, e.g., recall of prerequisite information. The external conditions refer to conditions outside the learner that facilitate learning, e.g., presentation of examples of concepts by an instructor or by the instructional materials. Unless otherwise noted, the internal and external conditions that we present are useful for instructional situations in which there are children, adolescents, or adult learners.

In Chapter 4, we present research on the development of attitudes and values, and attitude change. We first provide an overview of attitude change theories, and then we present five theories to discuss in more detail. They are: (a) The Yale Approach, (b) Dissonance Theory, (c) Cognitive Balancing, (d) Social Judgment Theory, and (e) Social Learning Theory. In Chapter 5, we present a discussion of the development of moral and ethical behavior from several philosophical perspectives. We then discuss in some detail Lawrence Kohlberg's theory of moral development. In Chapter 6, we focus our attention on self-development. We first present an overview of personality theories, and then we present several selected theories or constructs that we

describe in more detail. These include: (a) the work of Alfred Adler, (b) the position of Carl Rogers, (c) three concepts from social learning theory—self-efficacy, self-regulatory behavior, and locus of control, and (d) the learned helplessness construct from attribution theory. At the end of each chapter, we discuss the internal conditions required for each component, and we list external conditions for each component.

In Chapter 7, we present four additional components of the affective domain: (a) emotional development and feelings, (b) interest and motivation, (c) social development and group dynamics, and (d) attributions. A section of Chapter 7 is devoted to each component. We have made a slight format change in this chapter. Rather than discussing the internal conditions, as we did in Chapters 4 through 6, we have listed them. We felt that the internal conditions were straightforward and often similar to those presented in the previous three chapters, and therefore did not require discussion. The external conditions for each component are also listed as they were in Chapters 4, 5, and 6.

Our review of research in Part II is by no means exhaustive. We did not attempt to do a complete literature review of each category. We have, however, selected what we believe to be representative theories or aspects of theories that would assist us in our task of integrating the affective and cognitive domains. Although we have only briefly addressed representative theories, or parts of theories, we hope we have done them justice.

Ringness (1975) stated in the Preface of his book, "The fact that attitudes and values are learned presents us with our greatest hope for the future." We concur. We hope the conditions of learning we have derived from our literature review will enable teachers, instructional developers, and curriculum specialist to do a better job planning for instruction that involves behaviors in the affective domain.

Chapter 3

Domain Taxonomies: Descriptions and Research

CHARACTERISTICS OF TAXONOMIES OF EDUCATIONAL OUTCOMES

A Taxonomy as a Classification System

The Complexity of the Taxonomy

Descriptive and Prescriptive Taxonomies

TAXONOMIES OF THE COGNITIVE DOMAIN

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Major Categories of Learning Outcomes
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Summary

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OTHER COGNITIVE TAXONOMIES

Summary

TAXONOMIES OF THE AFFECTIVE DOMAIN

Krathwohl, Bloom, and Masia's Taxonomy

Condensed Outline of the Taxonomy
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Other Affective Taxonomies

Summary

RESEARCH INTEGRATING THE COGNITIVE AND AFFECTIVE DOMAINS

SUMMARY

Chapter 3

Domain Taxonomies: Descriptions and Research

In this chapter, we review the various taxonomies of the cognitive and affective domains and the research related to them. Most of the research has been conducted on the domains separately; however, several studies have been conducted, or are being conducted, that have attempted integration. In addition to these studies that directly address domain integration, another group of studies has been conducted that demonstrates causal or correlational interactions among subcategories of the domains or constructs related to a domain. Studies showing that positive attitudes toward a content area or subject yield higher achievement scores than do negative attitudes are one example. While these studies do not directly relate to domain taxonomies, they do demonstrate the interaction of cognitive and affective behaviors.

We begin this chapter by explaining what taxonomies are and how they can be used. Then we review the major taxonomies of both domains and the research related to them. Last, we review research done on the interactions of the domains, including a brief review of interaction studies not directly related to domain taxonomies.

CHARACTERISTICS OF TAXONOMIES OF EDUCATIONAL OUTCOMES

A taxonomy provides for the orderly classification of objects,

substances, plants, animals, or processes. A taxonomy in physics allows us to classify substances as liquids, solids, or gases. A taxonomy in botany allows us to classify plants by their characteristics. A taxonomy in zoology allows us to classify animals by their characteristics. What do educational taxonomies enable us to do? This is the central question addressed in this chapter.

Various educational researchers have offered taxonomies in the broad domains of (a) cognitive outcomes, (b) affective outcomes, and (c) psychomotor outcomes. In this book we are concerned with how to integrate instruction for the simultaneous achievement of cognitive and affective objectives. This task of achieving such integration becomes necessary because, generally speaking, different researchers have tended to concentrate their efforts in only one of these domains. This has resulted in the creation of three separate bodies of knowledge, without sufficient attempts to show how all three may be drawn upon for the purpose of designing instruction.

While three different sets of researchers have labored to produce the three types of taxonomies and their three corresponding areas of knowledge, taxonomies have not been sufficiently *used*, in teaching, research, or instructional design. Thus, one often reads a journal article reporting a learning experiment without being certain as to the type of outcome being dealt with, because the author of the article has not clearly classified the objectives, tests, and learning materials. The same can be said for many lesson plans and for many instructional materials produced by designers.

Most areas of research or practice would benefit by greater and more precise use of taxonomies. We hope to illustrate this in this book. But first we must examine the present status of educational taxonomies and the research relating to them. We do this first by examining the general characteristics of taxonomies, and second by discussing separately taxonomies in the cognitive domain and in the affective domain.

A Taxonomy as a Classification System

Just as a taxonomy of animals allows us to classify thousands of

individual specimens by assigning them to appropriate categories in the taxonomy, a domain taxonomy in education allows us to classify terms, concepts, goals or outcomes, assessment instruments, and/or lesson plans that are directed toward a particular outcome. A taxonomy of terms or concepts usually shows the breadth of the domain. A *taxonomy of educational outcomes* allows us to classify thousands of instructional goals or objectives into appropriate categories. The basic requirement of such a taxonomy is a set of clearly defined categories for whichever domain or domains of outcomes it addresses. Taxonomies of educational outcomes allow us to classify (a) goals, objectives, and observed outcomes, (b) test items attempting to measure the stated objectives, and (c) lesson plans directed to the teaching of the stated objectives. These three uses of a taxonomy help us bring *congruence* among objectives, instruction, and measurement of the attainment of the objectives by the learners. By designing lessons to achieve this congruence, we have used a systematic procedure to enhance the effectiveness of the instruction, and by communicating this congruence to the learners we hope to gain their trust in the honesty of our intentions. This can promote an atmosphere of "working together" in the educational effort.

The Complexity of the Taxonomy

The more complex the taxonomy, the more precision we may attain in both the classification of objectives and in the design of instruction. For example, a zoology taxonomy listing only phyla as categories would not be as precise as a taxonomy also providing subordinate categories called genus, species, etc.

As will be seen later in this chapter, the taxonomies we review, in both the cognitive and affective domains, vary somewhat in their degree of complexity. A difficulty we will encounter is that it is not possible to translate directly from one taxonomy to another, because the individual categories and sets of categories do not appear to describe exactly the same types of objectives or outcomes. For this reason, in designing either a lesson or a research study, we will be forced to select one taxonomy for use. We are tempted to conclude that communication would be

simplified if researchers and designers agreed to use *one* taxonomy for each domain. That would appear ideal at least in the short run. But of course we may not reach such an agreement. In the long run, it may be best that we don't, but at present our task is complicated by the lack of equal "coverage" by the taxonomies in a single domain.

Descriptive and Prescriptive Taxonomies

We have used the terms descriptive and prescriptive to refer to taxonomies of different types. Actually it is not the taxonomy itself that is descriptive or prescriptive, but rather the taxonomy plus the materials and explanations that accompany it. If the taxonomy authors provide sufficient materials to allow objectives, test items, and/or lesson plans to be derived from the taxonomy, we have labelled it prescriptive. So, a prescriptive taxonomy may be accompanied by an entire model or theory for the design of instruction, all organized around the categories in the taxonomy. In that case, the author of the taxonomy has not only provided the taxonomy itself; he or she has also shown us how to use it in designing lessons and instructional materials.

A descriptive taxonomy, on the other hand, is one that permits reliable classifications of terms, labels, and sometimes even objectives and test items, but generally does not include the supporting materials to allow a user to design lessons. It generally describes a range of concepts or terms, but does not allow for prescriptions.

Descriptive and prescriptive taxonomies, however, are not discrete categories; rather, they form a continuum. One taxonomy of the affective domain, the one proposed by Gephart and Ingle (1976), is described by the authors as a list of terminology, but it is actually a categorization of affective behaviors or responses. They say the classification is only a "suggested direction" and that they felt quite unsure about the placement of some of the terms. No operational definitions are given, no objectives or test items provided, and no directions, hints, or ideas about how to go about designing instruction are given. Of all the affective taxonomies we review, it is the most inclusive, but also the least prescriptive.

The cognitive taxonomy developed by Gagné (1977) is the most prescriptive one we will review. He has provided not only a classification system, but also the major components of a theory of instructional design. His theory, further expanded by Gagné and Briggs (1979), and by Briggs and Wager (1981), offers the following *prescriptive* concepts and procedures:

1. A list of nine instructional events which form the building blocks for designing lessons and instructional materials and activities, for all categories in the taxonomy.
2. A set of conditions of learning, differing for each category of outcomes in the taxonomy.
3. The technique of deriving learning hierarchies which displays the relationships and assumed directions of transfer of learning among the categories. This technique has been expanded upon, in the form of instructional curriculum maps, by Briggs and Wager (1981).

This brief list of some of the features of the taxonomy by Gagné has been presented here to explicate the meaning of the word "prescriptive." More details about Gagné's taxonomy are provided in the next section of this chapter.

TAXONOMIES OF THE COGNITIVE DOMAIN

Gagné's Taxonomy

While the taxonomy by Gagné (1977) includes a single category of motor skills and a single category of attitudes, his major contribution has been in the cognitive domain. We have chosen, for convenience, to classify his taxonomy as one for the cognitive domain. However, in our account of his work, we will include his limited coverage of motor skills and attitudes.

Gagné identified five categories of learning outcomes that can result from instruction. They are: (a) intellectual skills, (b) cognitive strategies, (c) verbal information, (d) motor skills, and (e) attitudes. For each category he described internal and external conditions of learning specifically related to that category, and he described nine events of instruction that are instrumental for designing instruction across all categories. Internal conditions of

learning refer to those abilities or capabilities within the learners that are necessary for learning to occur, hence, the term internal. They are usually in the form of prerequisites–skills, knowledge, attitudes, and motor skills–that were previously developed or learned and stored in memory. External conditions are those that can be arranged for in instruction and are, therefore, external to the learner. Gagné gives specific and different internal and external conditions for each type of learning outcome and for each subcategory of intellectual skills. For example, internal conditions for verbal information learning are (a) a pre-existing set of organized knowledge, and (b) the appropriate encoding strategies. For attitudes, internal conditions include (a) prerequisite concepts directly related to the attitude to be learned, (b) ability to identify important characteristics of a human model, and (c) concepts related to the personal action that the attitude prompts. External conditions for verbal information learning include (a) providing a meaningful context, (b) increasing the distinctiveness of cues, and (c) providing opportunities for repetition; for attitudes they include (a) providing opportunities to observe the human model, and (b) reinforcing the choice of personal action. These different conditions of learning for each type of learning outcome enable a designer to organize and plan instruction for each category of outcomes. We will provide a more in-depth coverage of conditions of learning in a later chapter.

In addition to the conditions of learning, Gagné also gives nine events of instruction that correspond to and facilitate the internal structures and processes of learning, e.g., expectancy, coding, memory, etc. These nine events occur during a learning situation, and their function is to provide the external conditions of learning for the class of outcomes under consideration. Unlike the conditions of learning, these events are the same for each type of outcome. The nine events are:

1. Gaining attention.
2. Informing the learner of the objective.
3. Stimulating recall of prerequisite learnings.
4. Presenting the stimulus materials.
5. Providing learning guidance.
6. Eliciting the performance.

7. Providing feedback about correctness of the performance.
8. Assessing the performance.
9. Enhancing retention and transfer.

These will also be made more explicit and clear in a later chapter.

Gagné's inclusion of conditions of learning and events of instruction with his taxonomy is extremely useful for designers, instructors, and teachers. The breadth of coverage–categories of outcomes including attitudes, motor skills, and three components of the cognitive domain–plus the conditions of learning and events of instruction, make this taxonomy useful for planning instruction, and applicable across many learning situations. It is a more prescriptive taxonomy than most.

Major Categories of Learning Outcomes

In this book, we refer to three broad "domains"–cognitive, affective, and psychomotor. However, Gagné refers to *five* domains. Three of his "domains"–intellectual skills, cognitive strategies, and information learning–are what we call the "cognitive domain." His "motor" skills are a component of the psychomotor domain, and his "attitudes" are a component of the affective domain.

Gagné has classified human learning into five domains categorized by learned capabilities. He defines learning as "a change in human disposition or capability, which persists over a period of time, and which is not simply ascribable to processes of growth" (Gagné, 1977, p. 3). These capabilities, which are unobservable as such, can be observed in a learner's behavior; that is, we infer from an observed behavior that a learner has acquired a particular capability. These capabilities result in the different outcomes and when they are planned for, they are stated as instructional objectives (Aronson & Briggs, 1983).

Gagné's five varieties of learning outcomes (domains) are:

1. *Intellectual skills*–The capabilities that enable the learner to use *symbols* to organize, interact with, and make sense of the world. The two basic forms of symbols, language and numbers, can be used in a variety of ways (e.g., reading, writing, distinguishing, combining, classifying, quantifying, etc.) toward this end. The use of symbols to

discriminate, form concepts and rules, and solve problems makes up the category of outcomes called intellectual skills. We classify such skills as part of the cognitive domain.

2. *Cognitive strategies*—The capabilities that govern the learner's own thinking, learning, and remembering behaviors. These are personal systems for guiding thinking, remembering, and problem solving, and they enable the learner to manage his own internal processes. We consider this one component of the cognitive domain.
3. *Verbal information*—Factual information that is either stored in the memory or can be looked up. It consists of labels or names, single facts, memorized sequences, and organized information. We consider this one component of the cognitive domain.
4. *Motor skills*—The capabilities of executing movement in any number of organized motor acts; they include the proper execution of movement and skills in a routine or sequence. We consider this one component of the psychomotor domain.
5. *Attitudes*—When a learner has acquired a mental state or tendency that influences his choice of a personal action, he has acquired an attitude. These states or tendencies are observed as *choices* rather than as actual performances. We consider this one component of the affective domain. See Chapters 4, 5, 6, and 7 for a discussion of other components of the affective domain.

Gagné (1962, 1970, 1977) has focused his attention on the cognitive domain (intellectual skills, cognitive strategies, and verbal information); and, within that domain, he pays particular attention to intellectual skills. While each of the human capabilities is important, Gagné (1977) and Gagné and Briggs (1974, 1979) suggest that intellectual skills are the most pervasive in school learning because they interact with all other kinds of learning. They are hierarchically ordered, and they are of central importance to school learning. We therefore next turn to the specific categories within the intellectual skills components of the cognitive domain.

Intellectual skills. Intellectual skills have been divided into seven types of learning, which form categories of mental processing ranging from least complex to most complex. They are: (a) making stimulus-response connections, (b) chaining, (c) making verbal associations, (d) making discriminations, (e) learning concepts, (f) learning principles and rules, and (g) solving problems. The first three categories are very basic and are learned in early childhood, so they usually are not significant components of school learning (Gagné & Briggs, 1974, 1979). Therefore, only the last four categories of intellectual skills will be emphasized. Examples of objectives representing the four categories are found in Chapter 14. The four categories are:

1. *Discrimination.* A capability of making different responses to stimuli that differ from each other along one or more physical dimension" (Gagné & Briggs, 1979, p. 63).
2. *Concepts.* Gagné and Briggs (1979) describe two types of concepts: (a) concrete concepts–"a capability that makes it possible for an individual to identify a stimulus as a member of a class having some characteristics in common, even though such stimuli may otherwise differ from each other markedly" (Gagné & Briggs, 1979, p. 64); (b) defined concepts–a capability that makes it possible to "demonstrate the 'meaning' of some particular class of objects, events, or relations" (Gagné & Briggs, 1979, p. 66).
3. *Rules.* The ability of the learner to respond with some "regularity over a variety of specific situations. In other words, the learner shows that he is able to respond with a *class* of relationships among *classes* of objects and events" (Gagné & Briggs, 1979, p. 67).
4. *Problem solving* (higher order rule using). The ability to solve problems or classes of problems by combining simpler rules to form more complex ones and then using these rules to solve real or intellectual problems (Gagné & Briggs, 1979).

Gagné (1962, 1970, 1977) hypothesized that these intellectual skills form a continuum of skills from simple to complex, and that they are hierarchically related. That is, the learning of a complex

skills requires mastery of the subordinate skills, or conversely, each subordinate skill is prerequisite to higher level skills. The levels of skills are cumulative in nature; the lower level skills form the basis for learning the higher level skills. Gagné (1977) refers to this as positive vertical transfer, because the learning of lower skills contributes to or supports the learning of higher skills.

Learning hierarchies. Since the intellectual skills are hypothesized to be both hierarchically ordered and cumulative, "the central issue is how . . . prerequisites of learning are to be identified" (Phillips & Kelly, 1975, p. 360). Gagné (1970, 1977) suggests that they can be identified by making a detailed analysis of the intellectual skills required to perform the given task. The result is a *learning hierarchy* which "is an arrangement of intellectual skill objectives into a pattern which shows the prerequisite relationships among them" (Gagné & Briggs, 1979, p. 147-148).

An objective is an operational definition that states what an individual will be able to do after instruction. It describes a test performance. It is a nonambiguous statement which, according to Gagné and Briggs (1979), defines: (a) the "operations" (action verb) one must perform to achieve the objective; (b) the special circumstance, i.e., the test stimulus, the tools, constraints, time allotments, etc., under which the "operations" will be demonstrated; and (c) the inferred capability indicated by the test performance. In methods of writing objectives presented by other authors, the statement also includes the criterion for a required acceptable performance (e.g., *how well* the learner must perform).

In order to formulate a learning hierarchy, one begins with a statement of a terminal objective and then performs an instructional analysis by asking the question, "What prerequisite skills must the learner possess to perform this task given only verbal instructions?" This question is repeated until an ordered set of prerequisite skill objectives is generated. The result is a learning hierarchy which "identifies a set of intellectual skills that are ordered in a manner initiating substantial amounts of positive transfer from skills of lower position to connected ones of higher position" (Gagné, 1970, p. 239).

In order to verify this proposition that intellectual skills are

hierarchically ordered and cumulative, considerable research has been conducted. A preliminary study was conducted by Gagné (1962) in which he attempted to teach seven ninth grade boys how to find "formulas for the sum of *n* terms in a number series" (p. 358). Nine prerequisite skills were identified in the learning hierarchy; each one was taught to the seven students by means of a simple teaching machine. The students received a pretest to determine their level of competence prior to instruction, and they received a posttest after instruction. Six of seven students achieved success on the final task, and Gagné observed that none of the students acquired a higher level skill without first mastering those skills which were predicted to be prerequisite. In summary, he states, "These results provide additional evidence compatible with the idea of the learning hierarchy" (Gagné, 1962, p. 362).

Other studies (Gagné & Paradise, 1961; Gagné, Mayor, Garstens, & Paradise, 1962) also supported the hypothesis of the hierarchical arrangement of intellectual skills; however, White (1973) noted some specific methodological problems with the early studies and questioned the "proportion of positive transfer" index that was used. Subsequently, more recent studies (Gagné & Bassler, 1963; Kolb, 1967-68, Merrill, Barton, & Wood, 1970; Resnick, 1967; Resnick & Wang, 1969) have been conducted that provide varying degrees of support for the hierarchical model of intellectual skills. As the methodological problems associated with some of the earlier studies were overcome, primarily as a result of suggestions by White (1973, 1974a, 1974b), the support for the hierarchical model increased. "It now appears well established that hierarchies do represent patterns or maps of prerequisite intellectual skills leading to the terminal skill or skills in a piece of subject matter" (White & Gagné, 1974, p. 20). White (personal communication, 1984) further stated that he conducted his last "hierarchy study" in 1979 and, at that time, was tempted to state in an article that no further validation work was necessary on the hierarchical order of intellectual skills. The validity of the ordering of the intellectual skills was sufficiently established, he said, that the hierarchy postulate no longer required extensive study.

The term "learning hierarchy" has normally referred only to the learning of intellectual skills, and the method of research has been

the conduct of learning experiments. However, Hurst (1980b), employing a different research method, demonstrated hierarchical relationships between cognitive and affective objectives. This study, described later in this chapter, was one of the stimuli leading to the writing of this book.

Summary

Gagné's taxonomy of learning outcomes can be characterized by its breadth, that is, the inclusion of attitudes, motor skills, verbal information, cognitive strategies, and intellectual skills, and also by its prescriptive nature, i.e., the internal and external conditions of learning and the nine events of instruction. Gagné's taxonomy has been both applauded and criticized. For example, Snelbecker (1974) says, "One concern . . . is that the taxonomy . . . may be overly biased toward those learning aspects which have been studied by psychologists. . . . the taxonomy, therefore, may not adequately deal with the kinds of learning changes which are of greatest concern to educators" (p. 475). Hilgard and Bower (1966), however, regard the taxonomy developed by Gagné as "the beginning of a unified theory" of learning (p. 569). We believe it is a significant and extremely useful taxonomy. The taxonomy, coupled with the design model (Gagné, 1977; Gagné & Briggs, 1979) has been judged by Reigeluth (1983a) to represent the oldest and most comprehensive model of instructional design among those summarized in the book he edited.

Bloom's Taxonomy

The *Taxonomy of Educational Objectives, Handbook 1: Cognitive Domain* was developed by a group of college educators and researchers, headed by Benjamin Bloom, and published in 1956. The purpose of the *Taxonomy* was to develop a classification system that would enable educators and others to communicate more clearly about test items, educational objectives, and testing procedures.

Work on the *Taxonomy* was begun in 1948, guided by several principles and priorities intended to facilitate the purpose stated above. First, the classification of objectives was to reflect the

easily located. Readers are urged to check Bloom (1956) and Bloom, Hastings, and Madaus (1971) for complete descriptions of the categories and subcategories.

This taxonomy is not accompanied by a model of instructional design, as was the taxonomy by Gagné. Thus, we classify this taxonomy as descriptive, and Gagné's as prescriptive.

Condensed Outline of the Taxonomy

Taxonomy of Educational Objectives: Cognitive Domain

KNOWLEDGE

1.00 *KNOWLEDGE*: ". . . . the recall of specifics and universals, the recall of methods and processes, or the recall of a pattern, structure, or setting . . . The knowledge objectives emphasize most of the psychological processes of remembering. . . ." (Bloom, 1956, p. 201).

- 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

INTELLECTUAL SKILLS AND ABILITIES

> "Abilities and skills refer to organized models of operation and generalized techniques for dealing with materials and problems. . . . The abilities and skills objectives emphasize the mental processes of organizing and reorganizing materials to achieve a particular purpose. The materials may be given or remembered" (Bloom, 1956, p. 204).

2.00 *COMPREHENSION*: "This represents the lowest level of understanding. It refers to a type of understanding or apprehension such that the individual knows what is being communicated and can make use of the

material or idea being communicated without necessarily relating it to other material or seeing its fullest implications" (Bloom, 1956, p. 204).
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 technical principles, ideas, and theories which must be remembered and applied" (Bloom, 1956, p. 205).

4.00 *ANALYSIS*: "The breakdown of a communication into its constituent elements or parts . . . Such analyses are intended to clarify the communication, to indicate how the communication is organized, and the way in which it manages to convey its effects, as well as its basis and arrangement" (Bloom, 1956, p. 205).
4.10 *Analysis of Elements*
4.20 *Analysis of Relationships*
4.30 *Analysis of Organizational Principles*

5.00 *SYNTHESIS*: "The putting together of elements and parts so as to form a whole. This involves the process of working with pieces, parts, elements, etc., and arranging and combining them in such a way as to constitute a pattern or structure not clearly there before" (Bloom, 1956, p. 206).
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*: "Judgments about the value of material and methods for given purposes. Quantitative and qualitative judgments about the extent to which material and methods satisfy criteria. Use of a standard of appraisal. The criteria may be those determined by the student or those which are given to him" (Bloom, 1956, p. 207).
6.10 *Judgments in Terms of Internal Evidence*
6.20 *Judgments in Terms of External Criteria*

Validation Studies

One of the most extensive attempts to examine the structure and content validity of the *Taxonomy* was done by Kropp and Stoker (1966). Students in ten secondary schools, grades nine through twelve, were tested on one of four forms of tests

developed to measure levels of social studies and science content. Each test had two parts: (a) multiple choice items for Knowledge Comprehension, Application, and Analysis, and (b) free-response items for Synthesis and Evaluation.

Kropp and Stoker stated at the outset of the discussion of their study that "we have serious reservations about the propriety of our effort to validate the taxonomy" (p. 17). Their reservations revolved around the difference between "intended" student behaviors and "actual" student behaviors. Since the taxonomy developers classified the behaviors that an objective "intended to elicit," not those behaviors actually portrayed by students, Kropp and Stoker stated that if one held rigorously to that stipulation, inter-rater reliability would be the only true way to assess the validity of the taxonomy structure. While Kropp and Stoker acknowledged the intended versus actual behavior distinction, they proceeded "on the assumption that the usefulness of the taxonomy in educational planning and research depends upon the empirical demonstration that the structure of the taxonomy portrays actual student behaviors" (p. 17).

The results of their extensive study neither completely supported nor failed to support the taxonomy structure. They did conclude that the tendency in the data was to support the hierarchical structure; however, for the natural science form of the test, they reported a systematic reversal in the order of Synthesis and Evaluation.

In other studies reported by Kropp and Stoker, varying degrees of support for the hierarchical order of the taxonomy were found. When the studies used trained raters, the results generally conformed to the hypothesized structure. Kropp and Stoker suggested that raters could in fact classify the behaviors that an item is *intended to evoke.* When the studies used "taxonomy-type data," the results were mixed. For example, McQuire (cited in Kropp & Stoker, 1966) used an abridgment of the taxonomy and found a reversal of Synthesis and Evaluation. A study conducted by Smith (cited in Kropp & Stoker, 1966) used sublevels of the taxonomy. His results did not support the taxonomic ordering (Kropp & Stoker, 1966).

The data provided by Kropp and Stoker have been used in

TAXONOMIES OF THE AFFECTIVE DOMAIN

Krathwohl, Bloom, and Masia's Taxonomy

When Bloom and his colleagues began their work on classifying objectives, they intended to develop "a complete taxonomy in three major parts—the cognitive, the affective, and the psychomotor domains" (p. 7). The cognitive taxonomy was the first to be published, in 1956, the affective was second, and the third was never completed by them because the authors stated that they "find so little done about it [psychomotor behaviors] in secondary schools or colleges, that we do not believe the development of a classification of these objectives would be very useful at present" (pp. 7-8).

The authors stated that development of the Affective Taxonomy was considerably more difficult than was the development of the Cognitive Taxonomy. Several problems plagued their work from the start: lack of clarity in the objectives, inability to find an adequate organizing principle, and concern about whether or not such a taxonomy would be useful to and used by educators. Because of this, the idea of developing the affective taxonomy was almost dropped, but insistence from educators and measurement specialists prompted Krathwohl and Bloom to complete the task. They were aided by Masia, who wrote the sections on testing, and a host of other critiquers and critics. The Affective Taxonomy was published in 1964.

A major difficulty in constructing this taxonomy was lack of a basis for structuring the domain. The "simple to complex" and "concrete to abstract" principles used in the cognitive domain did not seem adequate for the affective taxonomy. After much consternation and search, the authors discovered an ordering principle that allowed them to construct a meaningful continuum. The principle was *internalization*, ". . . the process by which the phenomenon or value successively and pervasively becomes part of the individual" (Krathwohl *et al.*, 1964, p. 28). Although the original hope was to organize the taxonomy by definitions, the authors reported that the various terms and meanings of affective constructs, e.g., attitudes, values, etc., were nearly impossible to