INSTRUCTIONAL-DESIGN THEORIES AND MODELS:
An Overview of their Current Status

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11 Motivational Design of Instruction

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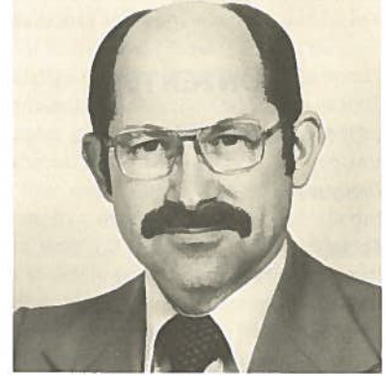

John. M. Keller

John M. Keller is an associate professor in Instructional Design, Development, and Evaluation at Syracuse University. Dr. Keller's work has centered on aspects of instructional systems design, with a special emphasis on problems of motivation and human performance in instructional settings. His research includes a number of published studies in specific areas of motivation including locus of control and learned helplessness. Currently, he is completing a handbook of motivational strategies for use by course designers and instructors. The handbook is based on the model described in the present book. It has been used in both the public schools and military training with positive results. Dr. Keller is a frequent consultant to schools, corporations, and the military.

Dr. Keller received his undergraduate degree in philosophy from the University of California at Riverside. After teaching in the secondary

schools in San Diego county for a number of years, he began doctoral study at Indiana University. He was awarded the Ph.D. in instructional systems technology with a minor in organizational behavior in 1974. Upon graduating, he accepted an appointment at Syracuse University. In 1975 he received the Outstanding Young Researcher Award from the Association for Educational Communications and Technology. He was recently awarded a Research Fellowship by the University of Twente in The Netherlands. He will be in residence there for one semester to continue his writing, and to study with the faculty of the Instructional Science Department.

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FOREWORD

John Keller's work represents an aspect of instructional design that has received relatively little attention: strategies for making the instruction more appealing. Of the theories and models described in this book, only the Gagné–Briggs theory and the Elaboration Theory explicitly include motivational-strategy components, and neither does so in a very pervasive or systematic manner.

Because it has received such little attention, work on motivational strategies for teaching cognitive objectives is at a considerably earlier stage of theory development than are other aspects of instructional design. Hence, the work described in this chapter does not yet represent a true instructional theory, or even a true model of instruction. Nevertheless, this chapter has been included: (1) because motivational strategies are so important; (2) because it is hoped that their inclusion here will encourage others to contribute to this area or to incorporate aspects of it in their own attempts to build integrative models of instruction; (3) because this chapter is highly integrative in that it draws on knowledge from many theoretical perspectives in its attempt to develop prescriptions for instructional design (which is a central theme of this book); and (4) because this chapter presents many useful prescriptions that can provide much guidance to instructional designers right now.

Keller has identified four major dimensions of motivation: (1) *interest*, which refers to whether the learner's curiosity is aroused and whether this arousal is sustained appropriately over time; (2) *relevance*, which refers to whether the learner perceives the instruction to satisfy personal needs or to help achieve personal goals; (3) *expectancy*, which refers to the learner's perceived likelihood of success and the extent to which he or she perceives success as being under his or her control; and (4) *satisfaction*, which refers to the learner's intrinsic motivations and his or her reactions to extrinsic rewards. Keller describes a smorgasboard of instructional strategies that can be used to improve each of these four dimensions of motivation and some bases for deciding when each of those straegies may and may not be appropriate to use.

In fact, each of Keller's four dimensions of motivation could be viewed as a potential "obstacle" to learning (see Chapter 2). In this case, Gropper's suggestion that "whether an obstacle is treated" is more important than "how it is treated" could become manifested in a model that specifies a menu of alternative strategies for treating each of the four potential obstacles.

This chapter represents a very significant, highly integrative contribution to an aspect of instructional design that is sorely in need of more attention.

C. M. R.

Motivational Design of Instruction

Ms. Thrush said, "Ok, that's it for the lesson. Now it's time for practice." She began handing out dittos. Each person received two. Several comments were directed to the teacher about these sheets.

"Are we gonna get more dittos?" No answer.

"How many of these do we have to do?" one boy asked.

"Twelve of them," she replied.

"BORING!" Carl said out loud.

"Ms. Thrush, how many of these do we have to do?" asked Millie from the other side of the room.

"A lot more than 12 if you keep asking me that," Ms. Thrush said, Don't forget, you've got a test on Friday."

This actual dialogue illustrates a teacher who is trying to solve several instructional-design problems at once. For example, she wants the students to respond actively, and to practice with concrete examples of the concepts she has been teaching. Both of these strategies are consistent with well-established instructional-design principles. However, she is also trying to solve a motivational problem, that of keeping the children's attention directed towards the task during the entire class period. Her approach is familiar, as we can easily remember how we or our children have suffered through endless reams of deskwork aimed at keeping us busy.

The children's comments clearly indicate that Ms. Thrush's motivational strategy is not successful. The children are variously bored, irritated, or apprehensive. This teacher's problem, which resulted despite her well-intentioned effort, simply illustrates an important problem in our knowledge of instructional design. As Chapters 4 to 10 indicate, our understanding of how to arouse and maintain student interest in learning lags far behind our knowledge of how to facilitate learning once the student has the desire to achieve.

This lack of attention to motivation is mirrored in the assumptions of various researchers, for motivation has played a curious role in instructional design and instructional theory. It is not explicitly included in some approaches to instruction (e.g., Carroll, 1963), it is subsumed under more general terms such as *aptitude* in others (e.g., Cronback & Snow, 1976; Walberg, 1971), it is equated with reinforcement or feedback in some (Skinner, 1968), and it is not regarded as essential to learning in still others (e.g., Ausubel, 1968). More commonly, however, motivation is explicitly labeled as an element in a given model (e.g., Bloom, 1976; Cooley & Lohnes, 1976; Gagné, 1977; Reigeluth & Merrill, 1979), but procedures for influencing motivation are never presented with the detail or precision of the procedures to facilitate concept acquisition.

Why, one might wonder, is there so much diversity, even in the definitions of where motivation belongs in a theory of instruction and learning? Some answers to this question are included in the following pages, but the primary purpose of this chapter is to offer the initial version of a systematic, theory-based approach to designing motivating instruction. For brevity, this approach is called *motivational design* and, in a later section, is distinguished from other elements of instructional design.

The accomplishment of this chapter's goal requires a number of steps. The first is to clarify some of the *problems* faced by the instructional researcher or designer who wants to study and influence motivation. The problems that have impeded progress in this area are by no means solved, but some progress has been made. The second step is to present a *theory** that illustrates the role of motivation in relation to other psychological and environmental factors in the learning situation. This theory provides the context for understanding the parameters of motivation in contrast to other influences on learning.

The third, and major, portion of the chapter is the presentation of a *model* for motivational design. This section begins with a general overview of the model and is followed by a detailed presentation of its four elements. The final section of the chapter highlights approaches to implementation, limitations of the model, and a number of areas in need of research and validation.

PROBLEMS IN THE STUDY OF MOTIVATION

There are many problems to be faced by the instructional designer who is interested in motivation. To discuss all of these issues would require a thorough historical review of the topic, and that is not the purpose of this chapter. However, there are two particular problems that warrant attention before proceeding. The first is attitudinal, whereas the second is technical and refers to both the theory and measurement of motivation.

A Concern for Motivation

The first problem in trying to develop and implement a systematic approach to motivational design lies in the traditional attitudes and definitions used by instruc-

*Editor's note: This is a *descriptive learning theory* as defined in Chapter 1, and to some extent it serves as a metatheory for the instructional-design model presented in this chapter.

tional technologists (not to mention their clients). For example, we often read that the goal of instructional technology is to design effective and efficient instruction. Unfortunately, these criteria make it easy to *exclude a specific concern for motivation,* or the appeal of instruction. The assumption all too often has been that if instruction is of good quality, motivation will take care of itself. Unfortunately, this assumption has been found to be only partly true. When we examine the meaning of "quality instruction," we discover that it generally refers to results in more or better learning per unit of time than other comparable methods of instruction.

Given this definition of quality, we can illustrate that it does not adequately account for motivation. It is true that one consequence of motivation is to contribute to better learning, and this is consistent with the previous definition of quality. But, another consequence of motivation is intensity of performance at a task. People tend to persist longer, or more intensely for a shorter period, at tasks when they are motivated than when they are not. However, in several cases it has been found that high-quality instructional programs resulted in superior learning when the students finished the entire course, but that large numbers of people dropped out or procrastinated excessively relative to the comparison groups. These results have been particularly noticeable in self-paced, independent-study courses (e.g., Alderman & Mahler, 1973; Johnston, 1975). Thus, we can have courses that are of demonstrably better quality with respect to the learning objectives, but less appealing than the comparison groups.

This distinction is important because it helps to identify motivation as an influence in instructional design that is not subsumed by the influences on efficiency and effectiveness that have traditionally been researched by instructional theorists. The growing concern for more research in this area was noted particularly by Cooley and Lohnes (1976), who indicated the need for improved measures of motivation that can be used in survey research. This could help in the understanding of the specific nature of motivation in relation to performance, and in relation to noncognitive variables such as quality of experience in school.

A Need for Better Measures

A second, more technical problem concerns the characteristics of motivation and efforts to measure it, particularly when contrasted with the concept of ability. In this chapter, a rather traditional distinction between motivation and ability is maintained. This is in contrast to the tendency established by Cronbach and Snow (1976) and Walberg (1971) to subsume all human characteristics under the term *ability*. In the present chapter, motivation refers, in a general way, to what a person *will* do, whereas ability refers to what a person *can* do. This usage is consistent with the preponderance of research and the associated technical definitions of the two terms in the literature.

In comparing the research on motivation and ability, there seems to be little doubt that people are much more stable, or consistent, in their *ability* to be successful at a given task once they are committed to it than they are in the *commitments* they make. The *variability* of personal choices, and the associated degree of effort exerted, are reflected in the variability shown in many of the measures of motivation. This issue of variability has been discussed by both Weiner (1974) and Mischel (1973), but from different perspectives. Weiner (1974) categorizes ability and effort respectively as stable and variable human characteristics that serve as two types of internally oriented attributions for the cause of given performance outcomes. Mischel (1973) discusses the issue more in terms of the difficulties of establishing a solid line of research and application in the area of motivation that would compare to the steadier progress in the study of ability and performance. In both cases, the characteristics of motivation as described by these two writers underscore the need to examine the concept of motivation and some of the theoretical issues that make it difficult to study.

It is *difficult to operationalize* the concept of motivation in as straightforward a manner as the concept of ability. Even though ability has been studied from many perspectives ranging from a general ability factor to a host of highly specific abilities, there are a number of different ways to measure ability. Furthermore, the measures of general ability tend to be consistently correlated with each other and with performance.

Motivation, by definition, refers to the magnitude and direction of behavior. In other words, it refers to the *choices* people make as to what experiences or goals they will approach or avoid, and the *degree of effort* they will exert in that respect. As such, motivation is influenced by myriad internal and external characteristics. People respond to their environment on the basis of inner reflexes, impulses, perceptions, and goals, and on the basis of perceived and actual opportunities and reinforcements in the external environment. Historically, various theories of motivation have tended to incorporate specific personal or environmental variables, but until recently almost none have tried to systematically incorporate both (Weiner, 1972).

Consequently, the term motivation is interpreted in many ways. The resulting difficulties in developing an adequate *theory* of motivation have been accompanied by corresponding difficulties in developing adequate *measures* of motivation, particularly academic motivation. Surrogate measures, such as family socioeconomic status, have been shown to have a substantial and consistent relationship to performance in school (Walberg, (1971), but direct measures of motivation tend not to be highly correlated with performance or with each other (Keller, Kelly, & Dodge, 1978). *Direct measures* are needed, because they will assist in the process of identifying specific motivational problems and the effects of instructional techniques on motivation. Surrogate measures only help to predict initial motivation with respect to the general importance of schol in one's development.

The need for more adequate measures of academic motivation has been identified by many researchers (e.g., Cooley & Lohnes, 1976), and this need is underscored in the present argument by the need for *better theory* upon which to base

better measures. At the same time that these concerns are being expressed, there has been rapid growth recently in psychological research on a number of motivational concepts. In a recent review (Keller et al., 1978) of measures of several of the better known of these concepts in an academic context (e.g., locus of control, achievement motivation, curiosity), several questionnaire-type, self-report measures were found for each concept. However, the availability of these instruments does not help the instructor know which one to use under a given set of circumstances. And, it would not be feasible in most instructional situations, whether for research or practice, to use a battery of instruments to measure each of several motivational concepts. Hence, there still exists the need for a measure of general academic motivation. A few of these were found (Keller et al., 1978), and some had promise (especially Moen & Doyle, 1978), but none systematically measured specific aspects of motivation within the framework of a general theory of motivation and instruction. Such a measure is in prepration and has undergone preliminary testing (Keller & Keller, 1981).

MOTIVATION AND LEARNING

Of equal or greater importance than the two problems just discussed is the need for an adequate *theoretical basis* for understanding motivation in education. Such a theory provides the basis for a systematic approach to developing motivational-design strategies. In an earlier paper (Keller, 1979), a theory was presented that serves as the roots of the motivational-design approach described in this chapter. The following brief review highlights the key points of the theory together with a brief discussion of its characteristics and its relationship to the motivational-design model.

Motivation, as argued in the earlier paper (Keller, 1979), is the neglected "heart" of our understanding of how to design instruction. Historically, instructional science has benefited from the work of behavioral psychology and cognitive-learning psychology, but this has given us only partial knowledge of how people learn, and almost no knowledge of why they learn. Working from the perspective of behavioral psychology, early instructional scientists (e.g., Markle, 1969; Skinner, 1968) derived strategies for the organization of instruction to allow the effective use of feedback. This required active responding with minimal errors to provide a context for the contingent use of *feedback and reinforcement*. These approaches contributed to improvements in learning and, in a very qualified sense, to motivation. Given that a person is already interested in a subject and is actively responding, then the appropriate use of feedback will help maintain and sometimes increase that behavior.

Additional knowledge from cognitive psychology and information-processing research (e.g., Ausubel, 1968; Mayer, 1977) provided the basis for a better understanding of how to organize instruction to improve the acquisition and retention of knowledge and skills. Instructional scientists then developed strategies and prescriptions for the design of instructional materials (e.g., Gagné, 1977; Merrill, 1975; Reigeluth, 1979). These characteristics are also studied in relation to individual differences in ability and learning style (Cronbach & Snow, 1976).

Keller's (1979) theory of motivation, performance, and instructional influence illustrates how motivational theory can be integrated with these other two major influences in instructional science. On the one hand, this theory illustrates how to better understand what influences a person to approach or avoid a task. On the other hand, this theory illustrates how to approach the problem of making a task more interesting. This theory, building on the earlier work of Porter and Lawler (1968), clearly distinguishes between effort and performance as categories of behavior (see Fig. 11.1). *Performance* means actual accomplishment, whereas *effort* refers to whether the individual is engaged in actions aimed at accomplishing the task. Thus, effort is a direct indicator of motivation. We know that people are more or less motivated by the vigor or persistence of a behavior. In contrast, performance is a measure of learning and is only indirectly related to motivation; it is also influenced by ability and opportunity (learning design and management). Ironically, most studies of motivation in education use learning (as measured by grades or some other indicator of accomplishment) as the dependent variable.

A further distinction is made between performance and consequences. *Consequences* include both the intrinsic and extrinsic outcomes that accrue to an individual. These include emotional, or affective, responses, social rewards, and material objects. Consequences are related to motivation because they combine with cognitive evaluation (see Fig. 11.1) to influence changes in one's personal values or motives. These effects will, in turn, influence the degree of effort under similar circumstances in the future. This concern with the consequences of an immediate activity on future motivation for the activity has been discussed by Maehr (1976) as continuing motivation.

As illustrated in Fig. 11.1, this theory is in the tradition of field theory (Lewin, 1935), or social-learning theory (e.g., Hunt & Sullivan, 1974; Rotter, 1972), in which behavior is considered to be a function of the *person* and the *environment*:*

$$B = f(P \,\&\, E).$$

Keller's theory describes the influence of these two factors on three categories of responses: effort, performance, and consequences. This classification provides an effective means for integrating research. To illustrate, the preceding discussion of historical influences on instructional science can be quickly summarized in terms of this theory. For example, the study of reinforcement is an E variable that primarily influences consequences. There has been a great deal of research on this environmental factor, but relatively little on the P variable of cognitive evaluation. The

*Editor's note: In terms of the theoretical framework presented in Chapter 1, most person variables are instructional *conditions*, whereas most environment variables are instructional *methods*.

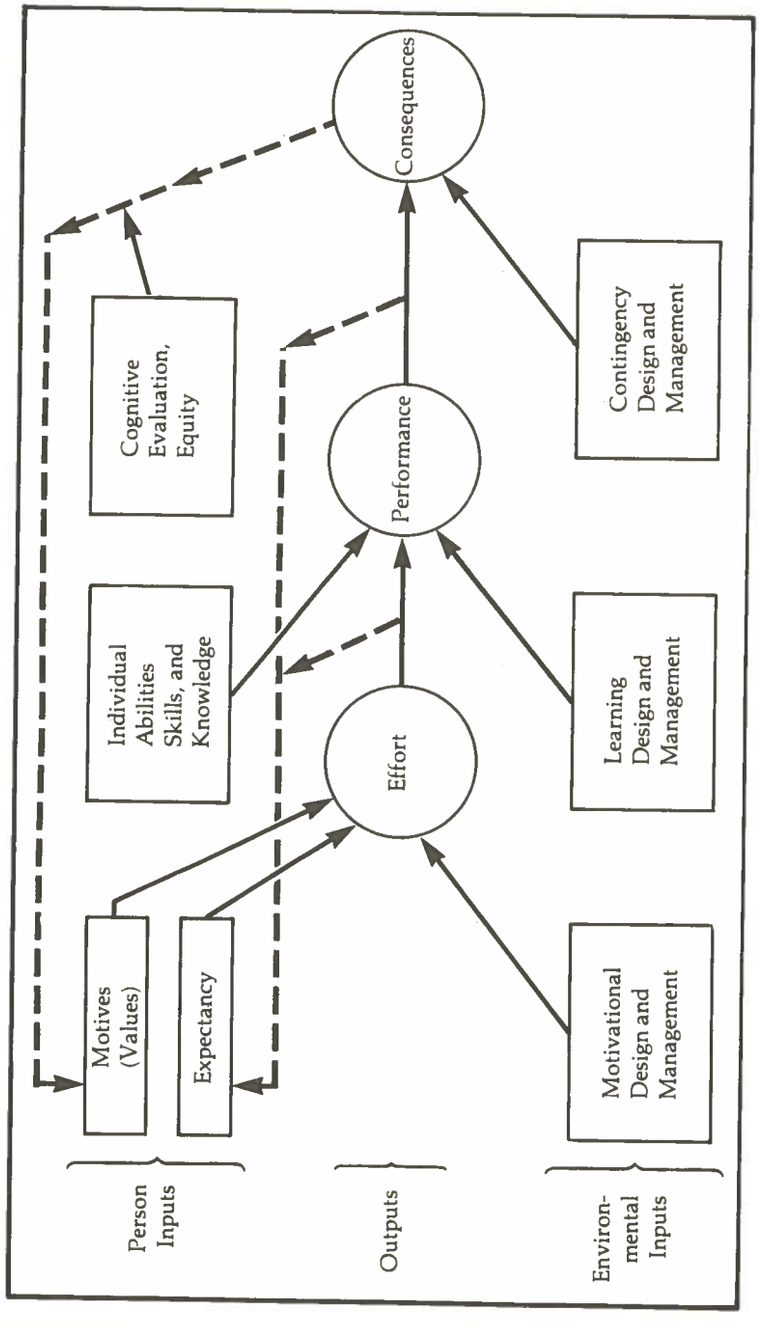

FIG. 11.1 A model of motivation, performance, and instructional influence.

work of Deci (1975), Condry (1977), and others suggests that there are important *P* factors that modify the effects of environmental contingencies.

Moving to the center of the model, there has been a great deal of research on *P* variables related to individual differences in performance, and there is a rapidly growing body of research and theory concerned with the optimal design of instruction (*E* variables) to maximize learning.

However, moving to the left, we come to the two primary areas of influence on motivation. There are many theories and lines of research on the individual characteristics of human motivation, *P* factors, but very little on ways to systematically influence motivation by means of instructional design, *E* factors.

Before elaborating further on this theory, particularly its motivational components and their relationship to the motivational-design model to be presented, it is worth considering what type of a theory this is. Keller's (1979) theory of motivation, performance, and school influence clearly is not in the tradition of micro theories* that have been in vogue for quite a number of years in psychology and education. In contrast, the purpose of this theory is to identify *major categories* of variables of individual behavior and of instructional design that are related to individual effort and performance. This theory incorporates the theories and paradigms that have received the major focus of attention in instructional science, and illustrates how motivational theory will interface with the earlier work. As such, the proposed theory is, in Kaplan's (1964) terms, a macro theory, or concatenated theory. It describes a network of relationships that provide a type of explanatory shell for the factors, or phenomena, that the theory attempts to explain.**

The present theory clearly attempts to be more analytic and inclusive than particular, and for several reasons. We technologists, in contrast to scientists, tend to be working with a rather larger base of knowledge and skills. We require syntheses of those areas of knowledge that are most likely to improve our decisions in practical problem solving. However, in contrast to the traditional linear view of science as discovering basic truths that then filter down to an applied level (of Hilgard & Bower, 1975), it is probably more likely that technology benefits selectively from science. Technology will benefit from useful syntheses of scientific knowledge if particular technologists *make the effort* to obtain the knowledge and write the syntheses (Kranzberg, 1968). In this same vein, these syntheses will be more meaningful and effective if they are presented in the context of an *organized structure* that facilitates their learning and retention. This is one of the purposes of the present theory. As a concatenated theory at the macro level, it serves as a "subsumer" in Ausubel's (1968) sense: It provides a structure in which to locate and remember many of the important concepts from the study of instruction and learning.

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*Editor's note: *Micro theory* is not being used here in the same sense that it has been used in most of the other chapters of this book.

**Editor's note: It should be fairly clear to the reader that Keller's *macro* theory is what was referred to in Chapter 1 as a *metatheory* or *paradigm* or *theoretical framework*.

However, this organizational purpose would not be adequately served if the theory had no validity, and would be relatively trivial if "subsumption" were the only function of the theory. The present theory also provides *heuristic and predictive functions* and, following Snow's (1973) argument, both descriptive and prescriptive functions. At a descriptive level of explanation, the present theory leads to predictions about the relationships among motivation, learning, and performance. At a prescriptive level, it leads to predictions about how we can influence these human characteristics by manipulating various components of the instructional environment. Furthermore, the theory has, in our experience, proven to be rich in heuristic value; that is, testable working hypotheses are readily generated as we introduce more specifically defined variables and consider their impact on the theory.

The primary concern with this theory in the present context is to illustrate a systematic basis for a motivational-design model. As illustrated in Fig. 11.1, the primary "person" influences on effort are motives (values) and expectancies. Together, these factors represent a motivational theory generally known as *expectancy-value theory* (see Steers & Porter [1975] for a review). It assumes that motivation is a multiplicative function of values and expectancies; that is, a person will approach activities or goals that are perceived to be personally satisfying and for which the person has a positive expectancy for success.

Within the *value* category would fall the research in areas such as curiosity and arousal (Berlyne, 1965), personal needs (Maslow, 1954; McClelland, 1976; Murray, 1938; Rogers, 1969), and beliefs or attitudes (Feather, 1975; Rokeach, 1973). With the exception of curiosity, each of these areas of research is concerned with understanding how the internal structure of individual needs and beliefs is related to choices for action—that is, to the direction in which individuals will exert effort. Curiosity, as a line of research, stands apart in some respects. Berlyne (1965) defines curiosity in one sense as an individual-difference variable representing a personal motive or need. But, he also defines aspects of curioisity in terms of arousal, which is more of a physiological variable, and would be closer to a psychological explanation based in drive theory (Hull, 1943). Without entering into the controversies resulting from shifting to various modes of explanation (cognitive versus physiological), the position taken in the present approach is to treat curiosity and arousal as somewhat different from the other variables in the "value" category. This distinction will be quite apparent in the motivational-design model described later in this chapter.

The *expectancy* term in this theory of motivation also encompasses several lines of research. These include locus of control (Rotter, 1966, 1972), attribution theory (Weiner, 1974), self-efficacy (Bandura, 1977), learned helplessness (Seligman, 1975), and other influences on a generalized expectancy for success or failure (Jones, 1977; Perlmuter & Monty, 1977). A common element in all these approaches is the attempt to explain the formation and effect of personal expectancies for success or failure in relation to behavior and its consequences.

Although values (including curiosity) and expectancies are the foundation of the theory to explain individual motivational tendencies, the macro theory (see Fig. 11.1) also includes the effect of *reinforcement* on motivation. In this case it is represented as a joint influence of consequences and cognitive evaluation. Following a performance, a person will experience an emotional response, such as elation, pride, despair, or tranquility. The person may also receive an external reward such as applause, a smile, or cash. Deci (1975), Condry (1977), and others (e.g., Bates, 1979) have shown that the relationship between intrinsic and extrinsic reinforcement is not simple. There seem to be conditions under which an extrinsic reward will actually decrease intrinsic motivation. Thus, a concern for rewards and intrinsic motivation is represented by their influence on the *value* a person places on a given activity.

In summary, Keller's (1979) theory of motivation, performance, and instructional influence is a macro theory that incorporates cognitive and environmental variables in relation to effort, performance, and consequences. It also distinguishes between three types of influence of instructional design. The first is *motivational design*, the second is *learning design*, and the last is *reinforcement-contingency design*. The assumption is that any instructional event, whether it is a teacher in a classroom or a module on a microcomputer, will have these three influences; and the task of the instructional scientist is to understand and control them.

MOTIVATIONAL-DESIGN MODEL*

Turning now to the motivational-design model, it is presumed that there are four basic categories of motivational conditions that the instructional designer must understand and respond to in order to produce instruction that is interesting, meaningful, and appropriately challenging.** The four categories, which are derived from the preceding presentation, are interest, relevance, expectancy, and satisfaction (see Fig. 11.2). *Interest* refers to whether the learner's curiosity is aroused, and whether this arousal is sustained appropriately over time. *Relevance* refers to the learner's perception of personal need satisfaction in relation to the instruction, or whether a highly desired goal is perceived to be related to the instructional activity. *Expectancy* refers to the perceived likelihood of success, and the extent to which success is under learner control.

The final category, *satisfaction*, refers to the combination of extrinsic rewards and intrinsic motivation, and whether these are compatible with the learner's anticipations. For example, we would expect a student who finishes 10th in a class of

*Editor's note: It should be evident from Fig. 11.2 that this is an instructional-*development* model or procedure, not an instructional-design model (see Chapter 1, p. 24), but the central part of the model provides the basis for prescribing instructional-design models.

**Editor's note: These *motivational conditions* are condition variables as defined in Chapter 1.

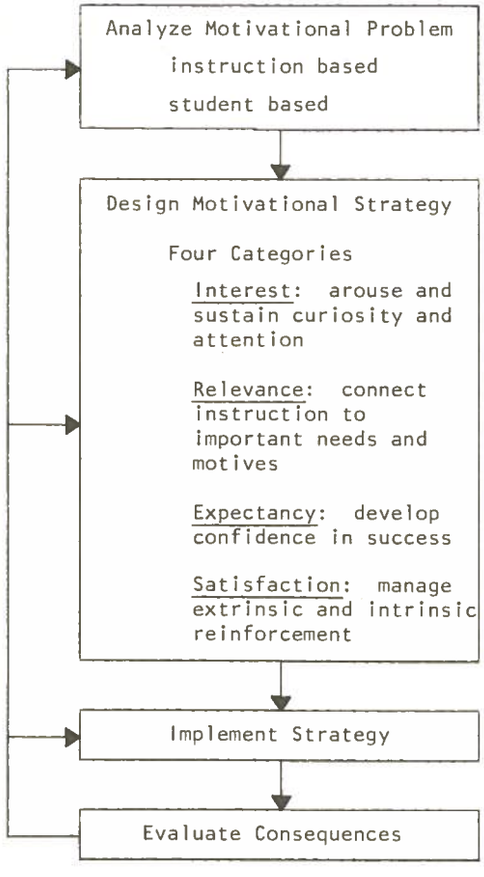

FIG. 11.2 A model for designing motivating instruction.

100 to feel good. But, if this student had a personal competitor whom he or she perceived to be inferior, and if the competitor came in seventh, then the student would feel bad instead of good. Equity theory (Adams, 1965) provides another approach to understanding the dynamics of social comparisons in relation to affective responses to outcomes.

This model serves three purposes. First, it provides a relatively parsimonious, theoretically based model for *integrating* the numerous strategies for increasing motivation. As indicated, this model is derived from the macro theory (Keller, 1979) that identifies the major categories of variables related to motivation.

Secondly, this model facilitates the effort to integrate motivation theory and motivational strategies with instructional-design theory.* Reigeluth and Merrill (1979 and Chapter 1 of this book), for example, have classified instructional variables into several sets of interrelated categories. One set of categories has three parts: conditions, methods, and outcomes. *Conditions* are variables that constrain or interact with methods, but that cannot ordinarily be directly manipulated by the instructional designer or educator. *Methods* are specific strategies for achieving different outcomes under different conditions. These are under the direct control of the instructional designer. *Outcomes* are the measurable influences of methods on the individual learner, a group of learners, or the learning institution. As illustrated in Fig. 11.3, these categories are further subdivided into three types of conditions and strategies and three levels of outcomes.

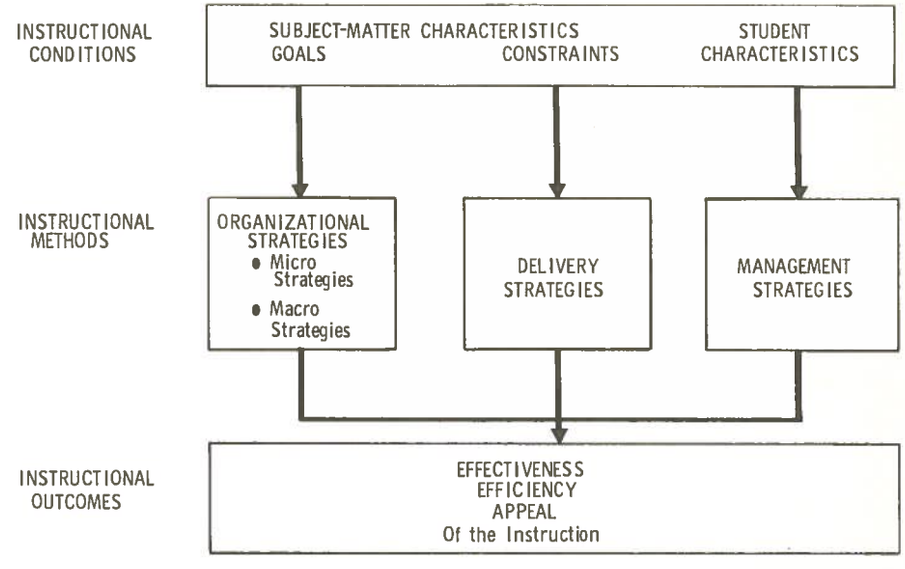

FIG. 11.3 A framework showing classes of instructional-method variables and the major condition variables that influence each. The classes of condition variables are *not* a complete list. Rather, they represent the conditions that are likely to have the strongest influence on each class of method variables. (This same figure was seen in Chapter 1.)

*Editor's note: The relationship between motivation theory and motivational strategies is similar to the relationship between learning theory and instructional strategies (see Chapter 1).

The identification of motivational conditions and strategies provides a convenient structure for presenting the present motivational model. Reigeluth and Merrill's distinction between conditions and methods corresponds roughly to Keller's distinction between two types of motivational problems: those located within the individual, and those located in the instruction. When there is a *severe* motivational problem in the individual, such as an extreme lack of confidence, then an intervention in the form of counseling or another type of behavior-modification strategy is needed. Normal instructional-design approaches would not solve this motivational problem. The assumption in the present model is that the students are within a normal range on the relevant motivational variables, and that an existing motivational problem is due to problems in the *instruction* rather than problems in the personality of the learner.

This leads us to the third major purpose of the present model. It allows a *problem-solving approach* to identifying the solving motivational problems. This model, when combined with a corresponding measurement approach, as discussed later, helps the instructional designer or educator to identify specific problems that might be depressing the motivational level of a student, classroom, or teacher. It can also be used in a preventative sense. The model helps to identify the critical areas on which to focus motivational-design efforts to improve the probability of success in a course.*

Four Motivational Components

Each of the four components of this model is a category that subsumes several specific concepts or micro theories of motivation. Each of these concepts or micro theories was developed in a context of understanding and predicting human behavior. As such, each concept describes a motivational condition that the instructional designer must match with appropriate parallel strategies. Each of the following four sections of this chapter describes, at a general level, the major motivational concept with its associated condition and instructional strategy or strategies. This general introduction is followed in each section by a more specific list of conditions and strategies.

INTEREST

The Concept of Interest

Practically every theory of learning includes some assumption about interest. A student has to at least be paying attention to a stimulus for learning to occur. As a motivational variable, interest encompasses several theories of *curiosity* and

*Editor's note: This shows great promise for providing a basis for prescribing different instructional models for the motivational design of instruction.

arousal. In education, one of the more widely used definitions of curiosity is that of Maw and Maw (1968). A curious person is one who:

1. reacts positively to new, strange, incongruous or mysterious elements in his environment by moving toward them or manipulating them;
2. exhibits a need or a desire to know more about himself and/or his environment;
3. scans his surroundings seeking new experiences;
4. persists in examining and exploring stimuli in order to know more about them [p. 2].

Given that these behaviors indicate curiosity, the challenge for the instructional designer is to know how to elicit them. Berlyne (1965) has been particularly interested in the properties of objects and conditions that *stimulate curiosity*. He found a number of such characteristics, which he called "collative" variables, including novelty, paradox, incongruity, and complexity. To include these characteristics in the design of instructional materials would enhance the likelihood of stimulating curiosity as defined in the first and third parts of the preceding definition of curiosity.

Another aspect of curiosity is reflected in the second and fourth parts of the definition. The inclusion of the collative variables in instruction will elicit curiosity, but it may be a rather passive, short-lived experience if the learners do not exercise their curiosity. Interest is more likely to be maintained if the students *engage in activities* that allow them to act on their curiosity by exploring and manipulating their environment. In many instructional settings, students are given very little encouragement or opportunity to explore, both in a physical and an intellectual sense.

Before looking at specific interent conditions and strategies, there are two distinctions and one caution that need to be made. These apply to curiosity in particular, and in some regards to motivation in general.

The first distinction is one that differentiates between two types of curiosity. Berlyne (1965) distinguishes between perceptual curiosity and epistemic curiosity. *Perceptual curiosity* is similar to attention; it refers more to a sensory-level reaction and selective attention in response to particular objects in the environment. Instructors and designers often capitalize on this type of curiosity by doing something startling at the beginning of or during a presentation. Of more interest to education, however, is *epistemic curiosity*. This refers to information seeking and problem-solving behavior that occurs as a result of the stimulation of curiosity. It is this type of curiosity that is evidenced when a child works at a jigsaw puzzle or a science problem.

A second distinction is made between state and trait curiosity. The term *trait* refers to the assumption that people have relatively stable proclivities with respect to such things as curiosity, need for achievement, anxiety, and so on. However, we see wide variations in behavior in different situations. Hence, *state* refers to the manifestation of a particular characteristic in a specific situation. Even though people have given proclivities, they may not be activated in a particular situation;

or due to the complex interrelationship of needs and desires, there may be motive conflicts in a given situation. A person who has a great deal of curiosity but dislikes responsibility may find that the exercise of curiosity in certain contexts leads to committee assignments. The person then may inhibit that tendency any time he or she anticipates its leading to unwanted responsibility. In this case, low *state* curiosity would inhibit *trait* curiosity.

In the classroom we often say that we want to foster creativity; we want students to do original thinking. Then we punish them for giving us "wrong" answers. Berlyne (1965) and others (e.g., Keller, 1978) have shown that people generally have to feel comfortable about the *consequences of taking risks* before they will exercise a great deal of curiosity. Therefore, in instructional design, we must be cognizant of whether we are designing educational situations that are consistent with the type of behavior we hope to observe.

A caution is in order that will apply throughout this model of motivation. The ancient Greek conception of balance and harmony, as exemplified in the "golden mean" of Aristotle, is very pertinent. Almost every motivational construct has an *optimal level* with respect to effective behavior. Stated in more modern terms, we are talking about the Yerkes and Dodson (1908) law, which suggests that the relationship between motivation and performance is, graphically, in the form of an inverted U. Too low a level of motivation results in less than optimal performance. On the other hand, excessive motivation also results in suboptimal performance due to anxiety and other sources of distortion and disorganization.

For example, achievement motivation has been shown to be at an optimal level with tasks of a *moderate level of risk*. Both low and high-risk challenges are related to a decrease in achievement motivation. Curiosity, and the closely associated concept of arousal, are presumed to follow the same law. In summary, it should never be assumed in the context of the model of motivational design that more of something is automatically to be preferred, as educators often do in the case of general intelligence. We are concerned with achieving a match between learners with a reasonable degree of curiosity, achievement motivation, and so on, and instruction that activates and fosters those characteristics.

Interest: Conditions and Strategies

In general, interest is a condition that exists when there is an *unexpected* or *inconsistent* event in the perceptual environment, or there is a *gap* between a given and desired state of knowledge. This two-part description is consistent with the previously defined distinction between perceptual and epistemic curiosity. It is especially useful for purposes of analysis and research, but only limitedly useful for design. In practice, some strategies are clearly identifiable as one or the other, such as slamming a book on the table, but many strategies have elements of *both*. It would be difficult, and seldom desirable, to develop a list of strategies that purported to be one or the other, especially because both types of curiosity are, within limits, desirable. *Perceptual curiosity* is certainly the easier of the two to arouse. There is a great deal of survival value for humans and other species in being sensitive and responsive to unexpected stimuli. However, most meaningful learning requires a *sustained* level of curiosity—or, as Aristotle would put it, wonderment—that is more challenging for the educator to sustain or nurture, and requires drawing on *epistemic curiosity*.

The following strategies begin with those that are simpler, operating more at the perceptual level, and progress to those that would contribute more to the development of epistemic curiosity. The last two are relatively complex and are represented by somewhat comprehensive models of teaching.

Strategy 1. To increase curiosity, use novel, incongruous, conflictual, and paradoxical events. Attention is aroused when there is an *abrupt change* in the status quo.

An unexpected stimulus, a puzzle, or *any device that creates perceptual or conceptual conflict* will increase attention and curiosity. People will seek information to explain or resolve the inconsistency. A lesson that begins with a question, statement, or other device that creates an *unusual perspective* in the mind of the learner will capture that learner's interest. A key element in this strategy is that it puts the learner into a problem-solving mode, even if the problem is nothing more than ascertaining the source and innocuousness of an unexpected stimulus (the slammed book).

The extent to which a student's curiosity can be held with this strategy depends on the *frequency* and *complexity* of its use. If students are bombarded with novel, incongruous, and conflictual stimuli, then the unusual can become commonplace and lose its effect, especially when there is insufficient time for the learner to actively respond to the situation in a problem-solving manner. This problem is probably best illustrated by the results of recent research on television. Children who watch large quantities of television, which provides such a continuous bombardment of stimuli, actually suffer impairments in learning and problem solving (Singer, Singer, & Zuckerman, 1980). The structure of a typical television show does not allow time for the rehearsal and transfer of information from short- to long-term memory, and it is a passive medium, one that encourages the undivided, passive attention of the viewer.

In summary, this strategy must be *applied judiciously*. Despite the preceding example of the consequences of excessive stimulation, the situation in school is more probably one of either understimulation or excessive complexity. That is, students are not likely to complain that they are being presented with too many novel and interestingly incongruous events. But, they are likely to develop confusions and misconceptions due to excessively complex and even unintended incongruities and paradoxes in the instructional material. In using this strategy, the stu-

dents' curiosity must be aroused by perceiving a problem, but the students must also be given an opportunity to *resolve* the incongruity, or, in other words, to solve the problem.

Strategy 2. To increase curiosity, use anecdotes and other devices for injecting a *personal, emotional element* into otherwise purely intellectual or procedural material.

People are usually more interested in the concrete than the abstract, and in *real people and events* rather than humanity in general or hypothetical events. Consequently, the use of *personal language* and *concrete stories* about real people can help maintain curiosity and dispel boredom. Flesch (1948) created a simple formula to measure the human interest of prose material. His formula is based on the proportion of personal words and personal sentences in a passage. Research has demonstrated the validity of Flesch's formula, and underscores the assumptions underlying this strategy.

Dramatic evidence for this strategy appears in McConnell's (1978) article entitled "Confessions of a Textbook Writer." McConnel's introductory psychology text is one of the most widely used and has a very low end-of-year return rate. He attributes this success, in part, to the use of *personal anecdotes* throughout the text. He conducted extensive developmental testing while writing his text, a procedure seldom employed by textbook writers (which he acknowledges) and long prescribed by instructional-development models (which he does not acknowledge). His testing demonstrated the value of the personal stories about the famous psychologists in the text, and confirmed the admonition he received from a professor, Karl Dallenbach, who was one of his mentors and role models (McConnell, 1978): "If you want to capture the imaginations of young people, you have to tell them stories [p. 160]!" Although we often accept this uncritically when dealing with children, the work of McConnell and Flesch suggests that the strategy is true with both young people and adults.

Strategy 3. To arouse and maintain curiosity, give people the opportunity to learn more about things they *already know about* or believe in, but also give them moderate doses of the *unfamiliar* and unexpected.

On the one hand, this strategy seems contradictory, and on the other hand, it seems similar to the first strategy. It is true that people enjoy opportunities to learn more about things they already know and are interested in. That is why people subscribe to special-topic magazines, join clubs, do research, and attend political rallies of their own party persuasion rather than to learn about their opponents. Recognition of this by educators is reflected in the frequently heard admonition to present instruction at the student's level of ability and interest.

However, despite this commonplace observation, we often find a gap between instructional content and student interest, especially in areas other than reading

where the teacher has some flexibility in selecting relevant stories. Even so, the strategy is valid and bears repeating in this context. One example of efforts to bridge the gap is provided by a teacher who uses *analogies* to help students find something familiar in material that might seem abstract and remote. For example, in teaching the structure of American government in seventh-grade social studies, this teacher asks the class how the three branches of government are like a two-story house with a basement. The students, in talking about the specific functions of the furnace in the basement, the return air ducts, the kitchen, living room, bedrooms, and so on, come up with the concepts of separate yet interdependent functions. In the teacher's experience, this has almost never failed to generate general interest in the class discussion, and increased interest in the functions of government. This particular analogy works well in New York, but might not in Arizona or southern California; however, the use of analogies is viable and is a good way to operationalize this strategy.*

The second part of this strategy is similar to the first strategy (using novel, incongruous, conflictual, and paradoxical events), but it is intended to focus more on unfamiliar, unexpected *content* or subject matter, as opposed to novelty in approach or example. Although there are individual differences in sensation-seeking tendencies among individuals (Zuckerman, 1971, 1978), people seem to enjoy moderate amounts of exposure to unusual or novel subjects. The inclusion of *unusual, or exotic, material* can help initiate or maintain curiosity in a group. However, even here a caution is in order. If a group is already highly curious about a particular subject, the inclusion of unexpected and divergent material can be irritating. For example, a group of doctors attending a briefing on the proper use of a recently licensed drug would want the essential information, and would want to get back to their practices as soon as possible. They would not appreciate extraneous material. In contrast, most designers are working with audiences that do not have as much inherent curiosity for the subject, and "human-interest" strategies will be helpful.

Strategy 4. To increase curiosity, use analogies to make the strange *familiar* and the familiar *strange*.

An established design and teaching model that is very effective for stimulating and developing epistemic curiosity is synectics. *Synectics* was designed by Gordon (1961) specifically for the purpose of stimulating creativity in problem-solving situations, and creativity is highly correlated with curiosity (Vidler, 1977). Although originally used in industry to stimulate creativity within groups of people who work as problem solvers and product developers, it has now been developed into teaching models (Joyce & Weil, 1972; Weil, Joyce, & Kluwin, 1978) to stim-

*Editor's note: See Chapter 10, p. 360, for more about the use of analogies in instruction.

ulate imagination and creativity. As is often stated in readings on the topic, synectics can be used to help make the strange familiar and the familiar strange.

At the simplest level, synectics can be used to stimulate curiosity by: (1) presenting a *divergent situation* (an incongruous analogy); and (2) requesting *convergent thinking*. For example, a teacher who uses synectics in a high-school social studies class uses a series of metaphorical, or analogical, exercises to loosen up the class, and to lead into a level of understanding of the content that exceeds the level of simply memorizing facts, concepts, and examples. These examples and exercises, taken from a unit on World War II, begin with a warm-up exercise in which the teacher asks the students, "Which is deadlier, a gun or a rumor?" After a discussion of this analogy, the teacher tries to stretch the students minds a bit by asking, "Who has a better sense of humor, God or Hitler?" In this case, every student gave the "right" answer at first, then someone mentioned that he had no evidence as to whether God has a sense of humor, but he had seen a film in which Hitler did a brief "dance" when told of a Nazi military victory. The class was then given a brief written exercise on the topic of "How is a rattlesnake like a dictator?" and "How is a tornado like a blitzkrieg?" Additional exercises required the students to produce their own analogies. The benefits of this approach as used by this particular teacher were cognitive as well as motivational.* With respect to cognition, these exercises served an information-processing function in that they facilitated the integration of this new knowledge with what the students already knew.

The combined motivational and information-processing functions of synectics can be formalized by a process that might be called *metaphoric organizers*. It is similar to the concept of advance organizers (Ausubel, 1968), but with an important difference. The advance organizer model, as described in Ausubel's theory of meaningful learning, is concerned with a learner's cognitive structure—that is, a learner's knowledge of a particular subject matter and how well organized, clear, and stable it is. When this cognitive structure is defective, learning suffers. When the cognitive structure is effective, learning is enhanced, because new knowledge can be meaningfully integrated into, or subsumed by, the given cognitive structure.

However, in some cases, the material to be learned may be rather abstract and remote from the learner's experience—two factors that tend to reduce curiosity and learning. In these cases, metaphoric organizers can help the students relate the new, unfamiliar, abstract knowledge to something that is concrete and familiar. This is similar to Ausubel's use of comparative organizers to help relate new material to previously learned, related material. Common examples include comparisons between electronics and plumbing, mathematical equations and balance scales, and human cognition and computers (information processing). Weil, Joyce, and Kluwin (1978) offer many examples for the effective use of analogy in the context of synectics.

*Editor's note: For more on the cognitive benefits of analogies, see Chapter 10, p. 360.

Strategy 5. To increase curiosity, guide students into a process of question generation and *inquiry*.

A second design and teaching model that seems ideally suited to fostering epistemic curiosity is inquiry teaching.* This model, not to be confused with discovery learning, was developed (Suchman, 1966) to help students *learn how to learn* with respect to the process of inquiry. This model produces teaching situations that provide the students with a process that is similar to the process a scientist, or any disciplined inquirer (Cronback & Suppes, 1969), undertakes when investigating a problem. This is in contrast to traditional approaches to teaching science, in which students are presented with laws and relationships during a lecture, then go to a laboratory to go through the motions of a series of "canned" experiments to verify what the lecturer has already told them.

It is noteworthy that the inquiry model begins with a *puzzling event,* something like an anamoly, a discrepancy between what is known and what will happen. This is followed by a learning process modeled after the *scientific method,* but it allows the students to investigate problems that are, in their eyes, original and capable of being solved at their level of understanding. The important factors in the present context are that this model both *stimulates* curiosity and provides the opportunity for students to *exercise* their curiosity. This model is well worth investigation by instructional designers (see Weil & Joyce, 1978).

In summary, one element of effective motivational design concerns the arousal and exercise of *curiosity* (or inteest) on the part of the learners. Because it is generally observed that students are understimulated far more often than they are overstimulated, instruction should benefit from efforts to incorporate the preceding strategies. The greatest danger is probably at the level of devising an extremely interesting opening, or "grabber," at the beginning of an instructional situation and not being able to follow through with an equally interesting program or presentation. That is why it is stressed in this section that the designer must be concerned with *arousing* and *sustaining* (or exercising) curiosity. To that end, the following principles (Keller, 1981) have been gleaned from the work on curiosity, and are offered for the assistance they might provide to the creative instructional designer:

With respect to curiosity, people tend to be:

1. Most interested in things they already know something about or believe in, but they also find the unfamiliar and unexpected to be intriguing in moderate doses.

*Editor's note: See Chapter 8 for an example of an inquiry approach to instructional theory.

2. More interested in real people and events than in humanity in general or abstract and hypothetical events.
3. Interested in anecdotes and other devices for injecting a personal, emotional element into otherwise purely intellectual or procedure material.
4. Interested in novel, incongruous, conflictual, and paradoxical events.

RELEVANCE

The Concept of Relevance

A second major motivational condition is that of relevance (see Fig. 11.2 earlier). Sustained motivation requirs the learner to perceive that *important personal needs* are being met by the learning situation. This general aspect of motivation has long been recognized as a progression of theorists have offered their explanations. One explanation is that of drive theory (Hull, 1943), in which motivation is defined primarily in terms of *physical deprivation*. Drives can range from primary physiological states such as hunger and thirst to secondary, acquired states such as fear and competitiveness.

In contrast, Murray (1938) explained motivation in terms of needs that act as "potentialities" of an organism to respond in particular ways under given conditions. Murray's explanation of the origin of a need is more *biological* than physical, and he identified a number of generalized needs. One of the best known of these is the *need for achievement,* which refers to a person's desire to do things rapidly and well, to overcome obstacles, to accomplish difficult tasks, and to attain high standards (Murray, 1938). Consequently, Murray viewed behavior as being goal directed: The organism will actively seek opportunities to change and grow in keeping with its need structures. This is in contrast to a more Hullian conception of a passive organism that responds to reduce stimulation—that is, taking a drink to reduce thirst, making friends to avoid loneliness, or achieving excellence to reduce job insecurity. However, there is still a similarity between the approaches represented by Hull and Murray. Both tend to see motivation as a difficult *tensional state* that persists until relief, or equilibrium, is obtained.

In keeping with Lewin (1935), Tolman (1949), and the general position taken in the present chapter, Murray assumed that behavior was a function of both *personal* and *environmental* characteristics. He is often recognized for his needs-press theory. A behavioral episode results from the press of the environment and the needs of the person. "Press" refers to obstacles, facilitation, and other characteristics of a situation that relate to the opportunity for need satisfaction.

Another major theorist in this context, McClelland, was influenced by the "why" of behavior (McClelland, Atkinson, Clark, & Lowell, 1953). Motives are learned and are represented by stimulus conditions that are associated with affective states. Furthermore, motives are aroused when there is a *discrepancy* between

a present affective state and a desired or expected affective state. This theory includes the concept of equilibrium, as do the previous theories, but with a difference. In McClelland's affect arousal theory, equilibrium occurs when stimulation is at a point greater than zero. This is not, as it might seem, contradictory. It is analogous to a physiological state of equilibrium that requires a certain degree of stimulation for homeostasis. For example, understimulation, as in sensory deprivation, will cause hallucinations. In McClelland's theory, if a present level of stimulation is above or below that level, the organism will act to decrease or increase stimulation.

The three particular motives studied most thoroughly by McClelland and his associates are the needs for achievement, affiliation, and power. His definition of *achievement* is consistent with Murray's as previously described. *Affiliation* refers to the desire for close, personal relationships with other people. These would be regarded as two-way, meaningful relationships, and not as the desire to "do things" for other people. The latter is often an indication of the need for *power*, which is a desire to influence other people. The study of these particular motives has helped the understanding of motivation in relationship to performance in such diverse settings as entrepreneurship, managerial effectiveness, and education.

Although these are theories of the major theorists in this context, they are only a sampling. Also well known for their work in a context of identifying personal needs and values in relation to personal motivation are Maslow (1954), Rogers (1951), and Atkinson (Atkinson & Raynor, 1974).

Relevance: Conditions and Strategies

The general motivational condition related to relevance is that personal motivation will increase with increases in the perceived likelihood of a task to satisfy a *basic need, motive, or value*. This is the basic value term in the previously discussed expectancy-value approach to explaining motivation. With the exception of curiosity, which was included in the first of the four parts of this model (see Fig. 11.2), this category includes all of the approaches to describing particular values.

Consequently, this category encompasses a vast body of specific concepts, constructs, and attitudes. At the operational level, there is almost no limit to the number of specific desires that might impell a person to action. Without the guidance of theory, the instructional designer would be hard-pressed to determine what needs or values would characterize a particular audience, and what design strategies would be appropriate. Unfortunately, there is no single, and accepted, theory that is useful in this context. However, based on the theoretical approaches covered in the brief preceding review and on the results of research in the context of education, three specific categories of value will be used in the present model.

The three categories of value, each representing a subcondition under relevance, are personal-motive value, instrumental value, and cultural value. The first cate-

gory, *personal-motive value,* suggests that increased value, or motivation, results when a given task or goal is perceived to offer satisfaction of a particular need or motive. Under personal-motive value are the lists of *needs* identified by researchers such as Murray (1938), Edwards (1970), Maslow (1954), and McClelland (1976). Among those that seem to be most pertinent to educational performance are three that are considered for illustrative purposes in this chapter. They are the needs for achievement, power, and affiliation. They have the advantage of a theoretical basis and a body of empirical study of their relationships to education (e.g., Atkinson & Raynor, 1974; McClelland et al., 1953).

The second category, *instrumental value,* refers to the increase in motivation to accomplish an immediate goal when it is perceived to be a required step for attaining a desired future goal. The effect of this future orientation and the perception of a series of contingent steps leading to a future goal has been described and studied most thoroughly by Raynor (1974).

Cultural value, the third category, is a well-known influence that parents, peers, organizations, and the culture at large have on motivation. Personal motivation increases when a desired goal is perceived to be consistent with the values of these reference groups. The values of these groups are not always consistent in a person's life, and *goal conflicts* can result, causing motivational problems. This is particularly noticeable with adolescents who develop peer-group allegiances that are incompatible with parental values.

Each of these motivational conditions suggests strategies for instructional design. Bear in mind that we are concentrating on strategies aimed at making instruction more motivating by being responsive to these three kinds of values. We are *not* presenting strategies designed to modify the motivational conditions in question, although that could be a consequence. For example, instruction that provides the opportunity for achievement need satisfaction could result in increases in the need for achievement in some learners. However, such results would be regarded as fortuitous in the present context. Following are several specific strategy suggestions in relation to each of the three relevance subcondition categories.

Personal-Motive Value Strategies

The following strategy descriptions are examples of the approach to take to connect motivational principles to instructional-design characteristics. They are not intended to encompass the vast amount of research that pertains to this general topic, but they do represent several of the major areas of study in an educational context.

Strategy 1. To enhance achievement-striving behavior, provide opportunities to achieve *standards of excellence* under conditions of *moderate risk.*

A person's feeling of achievement is enhanced when the person believes success to be a *direct consequence* of his or her effort, when there is a moderate degree of *risk,* and when there is *feedback* attesting to his or her success. *Competition* can

also be a factor in this process when the competition serves to inspire the participants to greater degrees of accomplishment. (There is another type of competition, as is described, that serves power needs rather than achievement needs.)

Specific approaches to operationalizing this strategy would include individual contracting with specified criteria for success, and non-zero sum-evaluation methods (described later). The principle of *individual contracting* can be utilized, as it traditionally is, in independent study; but it can also be embedded in a group activity. For example, deCharms (1976) described a learning activity called the Spelling Game. The instruction is designed so that each child in a classroom takes a pretest on the spelling list for the week. At the end of the week, the class is divided into two teams for a spelling bee. Each child has the choice of an easy, moderately hard, or hard word. An easy word is one that was spelled correctly by that particular child on the pretest. A moderately hard word is one spelled incorrectly on the pretest, but that the child has had several days to study. Finally, a hard word is one of comparable difficulty that the child has not seen before. Correct spelling of the word in the contest results in 1, 2, or 3 points, respectively.

This type of choice allows each child to establish his or her *own contract,* and to obtain immediate *feedback* regarding success. Furthermore, the social setting is such that the children are *encouraged* to do their best. There is nothing but social disapproval, another powerful form of feedback, for flamboyant, unrealistic attempts to answer difficult words, a condition that often prevails under normal contest situations. In addition, the achievement motive is stimulated in *all students.* Even poor spellers can earn 2 points by studying the words missed on the pretest. This type of structure can be used in other contexts to represent the general strategy description for achievement motivation, as can other approaches that stimulate moderate risk taking and the other characteristics listed in the strategy description.

A second example of design considerations in this context is the evaluation system in use. Alschuler (1973) points out that a *nonzero-sum scoring system* is best. Many types of competitive activities use a zero-sum scoring system. These systems require a penalty on one side for every gain on the other side. For example, grading on the curve, rank ordering, arm wrestling, chess, and standardized test taking are all zero-sum activities. In the spelling game *each child can be successful* independently of the overall outcome of the competition. Other examples include mastery learning, archery, performance contracting, and bowling. The nonzero-sum approach to evaluation allows each percon to *define standards of performance independently* of other persons, and competition is aimed at "passing the mark" established for the particular activity, rather than at simply "beating down" the rival.

In summary, there are entire books on the topic of increasing the level of achievement motivation in faculty and students (e.g., Alschuler, 1973; deCharms, 1976), and it is a challenging goal to bring about those changes. In contrast, the implications are clear for designing instruction to activate the achievement

motive, given its presence in the learner. The challenge for the instructional designer is to implement *achievement-arousing strategies* concurrently with the other motivational requirements of the learners. The following strategies, which are presented more briefly, illustrate this problem.

Strategy 2. To make instruction responsive to the power motive, provide opportunities for *choice, responsibility,* and interpersonal *influence.*

The influence of *power* in learning environments is often negative. The negativity results from instructional-design approaches (including arbitrary requirements and teaching styles) that effect *controls* on the learners that are unnecessary or not clearly related to the learning objectives. Because power is the process of exerting influence, whether aggressive, persuasive, or unsolicited helping behavior, the teacher or designer who uses power inappropriately may initiate power struggles *instead of learning* in a given situation. This is illustrated in the excessive display of helping behavior of some teachers. One type of helping behavior is the Good Samaritan variety. It consists of a helping response when there is an obvious need for assistance. In contrast, the excessively helpful person is often high in need for power. A teacher who is too quick to show students how to do something, or to show them the "one right way to do it" will often generate negative reactions in the form of hostility or low effort. This teacher may not understand that the students are responding to the power influence, and do not like it because they want to "do it" for themselves.

It is important to realize that power and control are not equivalent. The power motive is revealed by a person's effort to gain a position of *influence* over other people. This influence could take the positive form of helping meet the dependency needs of a client or subordinate (McClelland & Burnham, 1976), or the more negative form of argument for argument's sake, classroom disruptions, or arbitrary "busywork" assignments. In both cases, the person enjoys the feeling of having influenced another person's life, but in the latter case the goal is influence for the sake of influence without an overriding goal of trying to establish control or resolve misunderstandings. In contrast, *control* is a type of power that is necessary to accomplish certain goals; it is a means rather than an end. A teacher needs classroom control in order for desirable learning to occur, and a person high on need for achievement likes to have personal control over the resources necessary to accomplish a goal. The teacher, who has to be prepared to use influence and to respond to student attempts to gain influence, will be more effective if he or she understands and enjoys the use of power.

The person high on need for *achievement* is often irritated by *power* struggles and tries to avoid them. This person sees control as a means of circumventing the "political" aspects of interacting with people to gain resources and personal advantages. Some Presidents of the United States experience this conflict, for example, Nixon and Carter, who had lofty achievement goals, but who tried to avoid the lengthy and demanding processes of building a base of influence with all of the key

persons in Congress and other parts of the government (Winter, 1976). The desire for absolute control or, in a sense, absolute power, overshadowed the skill or desire for the process of competing for influence. In summary, when motive for power is strong, it means that the person derives pleasure from the process of wielding influence, whether or not achievement-type goals are obtained (McClelland & Burnham, 1976).

In instructional design, there are two problems with respect to power. One is to *avoid generating power conflicts* if possible, and the second is to *respond to students' power needs* when possible. The former is generally accomplished when rules are established and maintained consistently, providing that the rules are in the best interests of the students and that the students perceive this to be the case. Problems inevitably arise when a teacher, or the requirement in an instructional setting, is threatening and authoritarian and appears to serve only the personal power needs of the teacher.

However, even under the best of circumstances, some students will deliberately engage in power struggles with the teacher. This is one of the aspects of teaching that too few are prepared for before entering the classroom. Teachers generally have high, even idealized, expectations for the influence they hope to have on their students' lives. These teachers tend to be unprepared for students who fail to respond and who engage them in seemingly purposeless resistance. The resistance can be active, as with hostile, disruptive, and argumentative students, or passive, as with students who simply will not do the work.

These kinds of problems, coupled with other perhaps less dramatic signs of uncooperativeness, signal the need for more opportunities for students to satisfy their power needs. Sometimes this can be accomplished by *giving positions of authority* to students. We have all read stories about the social worker or teacher who converted a group of hostile opponents by identifying the leader, and winning the person over by giving the person a position of responsibility and enforcement. Similarly, elementary-school children experience a pleasant sense of personal power when they are selected for safety patrol, and get to leave class early. These leadership opportunities, when there is some *genuine authority* attached, give students experience with the exercise of personal influence.

In designing instruction to respond to the need for power in students, there are a number of strategies that may be employed. However, before describing them, a word of caution is in order. In a power context, the primary goal is *influence*. In an achievement context, the primary goal is *productivity*. Therefore, if the power motive is elicited without a corresponding requirement for goal accomplishment, these strategies may not have a beneficial educational consequence.

Power strategies are those that *provide the opportunity for influence or domination* over others, whether real or implied. Instructional strategies such as debating or the argumentative essay are traditionally acceptable strategies that elicit the power motive. These strategies require the utilization of knowledge and personal style for the purpose of "upstaging" an opponent, and not necessarily for the pur-

pose of increasing truth or knowledge. Other power-motive strategies would include any types of *zero-sum games or simulations*. These, as indicated earlier, are games in which one person or team gains only at another's expense, as in chess and normative grading systems. This type of power motivation in curriculum design often has negative consequences, because students will use whatever means they can to achieve a favored position.

In summary, the power motive is difficult to address in instructional design. Students with a high need for power may become antagonistic if they have no opportunity to exercise power, and if they perceive the teacher to be exercising arbitrary and unwarranted power. The best solution seems to be for the teacher to have well-defined standards with consistently enforced rules, and to offer opportunities for students to assume responsibility. This responsibility could be in the form of administrative tasks in the classroom, or academic positions as in debates or argumentative essays.

Strategy 3. To satisfy the need for affiliation, establish *trust* and provide opportunities for *no-risk, cooperative interaction*.

The need for affiliation is expressed as a desire for close, friendly relationships with other people, and the desire to engage in cooperative, noncompetitive activities. As a motivational condition, the affiliation need is activated when *friendly cooperation* is the expected behavior in a group. This need is frustrated when students have to study in isolation from each other, when individual competitiveness is required, or when success is possible only at the risk of personal embarrassment or failure. Obviously, the need for affiliation seems to be in conflict with many of the typical requirements of school. Competing to achieve standards of excellence, or to gain positions of advantage are very much a part of the American classroom. Consequently, it would appear to be impossible to design instruction to simultaneously satisfy the needs for achievement, power, and affiliation; yet these are not mutually exclusive personality characteristics. A person can score high on any combination of these motives.

The point for instructional designers is that just as no one experience in life will satisfy all three motives, neither can they be satisfied *simultaneously* by a given instructional experience. Self-study may be a highly effective and efficient method for delivering some instruction, especially if it is appropriately challenging with frequent feedback. This would appeal to a person with a high need for achievement, but could become demotivating to persons with high needs for affiliation or power.

A solution to this dilemma is to *vary the instructional strategies* during a prolonged period of instruction. With respect to affiliation, this need for belongingness may be satisfied by several strategies. The first is to satisfy it as a prerequisite to more challenging risk-taking activities. Keller (1978) demonstrated how a lack of psychological security, which may be interpreted as a fear of personal rejection by others, can inhibit risk-taking behavior in a learning situation. Keller (1978)

used a game in which the participants had to learn the rules by induction as they individually took turns trying to solve a concept-identification problem. Not until the participants learned the rules and overcame their fears of being embarrassed in front of the group did they relax and take the risks needed to find the solution. This is consistent with Maslow's (1954) hierarchy of human needs. It suggests that the need for affiliation must be satisfied *before* people will engage in the individual, competitive activities that lead to satisfaction of self-esteem needs.

The lesson for instructional designers is to include activities at the beginning of a learning situation that will *relax students' fears of social rejection*. In classroom situations, this often requires no more than taking a few minutes to establish personal contact with the group. In small groups, take a few minutes for introductions and personal comments. In large groups, as expert speakers well know, relate some human-interest information or anecdotes, and try to establish personal contact with one or two people in the group. In essence, one key motivational factor in relation to the need for affiliation is a negative one. That is, if people experience a *fear of rejection*, it may interfere with learning in a group setting. Therefore, the instructional designer has to *allay this fear* prior to engaging the students in the learning activity.

Two other design strategies are the inclusion of cooperative group activities, and shared-sum scoring systems. *Cooperative activities*, as opposed to competitive ones, allow people to enjoy social contact while trying to complete a task. An important part of the nondirective instructional-design model of Carl Rogers (1969) concerns the affiliative relationship of the teacher and learners. This relationship serves as a context within which individual, self-directed behavior can occur. The cooperative activity in this context may take the form of nonevaluative activities that allow the expression of warmth and responsiveness or the genuine acceptance of others as persons. Coffee breaks, "play" activities, and even group discussions of assigned material can serve this function, providing that the discussion leader is able to develop a sincere, positive atmosphere of acceptance in the groups. Another strategy is that of having students *work in groups* on an assignment. In teaching basic computing skills to children, it is helpful to have approximately three on a terminal. They tend to spontaneously work together in identifying mistakes, suggesting alternatives, and exploring options. The teacher in this setting has to ensure that the groups are compatible and that a single child does not dominate.

The final strategy described here is the shared-sum scoring strategy. Alschuler (1973) uses the example of team sports in which each member shares equally in the success or failure. This approach would also describe the instructional design and evaluation strategy in which students work as *team* and all get the same grade on their final product. This approach assumes that affiliative, cooperative behavior is required within the group in order for it to function effectively. The effect of this is seen in the comradery that is often developed among memebers of a team, or among the members of a class who move through a program together. However,

there is a caution here, as every teacher knows. After assigning a group of students to work on a task, it is often confusing as to how the task can be subdivided into *distinct subtasks* for the individual students. In the absence of meaningful divisions of labor, it all too often happens that one person ends up doing "all" the work, and this becomes demotivating. It can also happen, as it does in team sports, that there is competition for favored positions or assignments.

The problem in this strategy is that, even though the evaluation system is shared sum, there is an interaction of affiliation and competition (or achievement) needs. Even though the team shares in the outcome, there is *individual assessment*, even if it is informal, of personal contributions to the success or failure. Therefore, in designing learning activities that require group activity and that employ shared-sum scoring, it would seem to be important to ensure *a clearly defined role for each person* to play and a sense that each role is *important*.

In summary, these are but three of the personal-motive value strategies that can be identified. At present, there is no comprehensive theory that succinctly categorizes all of the human motives that might influence the perceived relevance of instruction. The important principle for the instructional designer to retain is that motivation for learning is enhanced when the *perceived relevance* of the instruction is increased. The preceding discussion focused on strategies for increasing perceived relevance by making the instruction responsive to basic motivational needs in the students.

Instrumental-value Strategies

Another major category of influence in the perceived value of instruction, which is mentioned only briefly here, is perceived instrumentality. Raynor (1974) has demonstrated, as teachers have intuitively understood, that motivation is increased if a present goal or task is perceived to be an important or necessary prerequisite for the accomplishment of desired future goals. Correspondingly, design strategies that clarify the importance of a given segment of instruction should improve learner motivation. This can occur at the macro or micro level. At the broader level, teachers have traditionally used statistics and career education to illustrate how education leads to *greater earning power* and *career choice*. At the micro level, one function of learning *objectives*, although not generally identified as such, is to illustrate the importance of particular elements of instruction for goal accomplishment.

Cultural-Value Strategies

The final condition and strategy presented in this context is cultural value. Individual motivation to accomplish a given task is increased to the extent that the activity is positively valued by the individual's cultural reference groups. If the individual perceives that his or her family, friends, and society all think an activity is important, then the individual is more likely to think it is important. Problems erupt when, as sometimes happens in adolescence, there is a conflict between a child's family and peer group. At a broader level, there seems to be a growth in

general cynicism about the value and quality of education in our culture, as evidenced by the publicized difficulties of Ph.D.'s and other graduates in getting jobs, and by highly critical news analyses, such as the recent report in *Time* magazine (e.g., Foote, 1980).

Instructional designers cannot necessarily be expected to introduce strategies that will solve psychological and social problems of this magnitude, but they can utilize strategies aimed at *improving the perceived cultural value* of instruction. Teachers try to use *positive role models*, by means of fiction and biography, in shaping student values. Similarly, in field testing his new, popular, introductory textbook in psychology, McConnell (1977) found that students were very interested in the *personal stories* about psychologists and other scientists. In one respect, these stories provided role models that attested to the cultural value of the subject matter. This suggests that when the motivational conditions are such that students are experiencing personal conflict or uncertainty about the value of a given course of instruction, the designer may increase perceived value by using culturally relevant *examples of accomplishment*. The insertion of anecdotes and personal examples into instruction could benefit this effort with adults as well as with children.

Summary

The concern for relevance is a major element in the motivational effect of instruction. It is not totally distinct from the earlier discussion of curiosity. As described in that section, curiosity is in one sense a motive that, when aroused by instruction, will make the instruction seem to be more relevant. Furthermore, some of the design strategies in that section deal directly with the problem of relevance, although from the standpoint of arousing and maintaining an appropriate level of stimulation. Together, the sections of this chapter dealing with curiosity and relevance combine into the *value* term of the expectancy-value theory of motivation (see Fig. 11.1).

The final two sections of this chapter are concerned with somewhat different motivational components. The first, *Expectancy*, refers directly to the other half of the expectancy-value theory. The final section, *Outcomes*, deals with the use of feedback and reinforcement, and other intrinsic and extrinsic consequences of behavior with respect to motivation.

EXPECTANCY

The Concept of Expectancy

The belief that a person's attitudes towards success or failure have a causal influence on actual events has a long history. The Greek myth of Pygmalian, the motivational workshops of Dale Carnegie, George Bernard Shaw's *My Fair Lady,* and Weiner Earhardt's EST are all based, at least in part, on this belief. Formal psychological studies based on this belief have taken several forms, but can be subdivided

into two categories: expectations about *others* and expectations about *oneself*. The research on this topic is vast, so the remainder of this "concept" section contains brief introductions to some of the major theoretical approaches. These provide a sufficient basis for understanding the subsequent discussion of conditions and strategies.

Expectations of Others

One of the more widely known theories of expectancies concerns individual expectancies for the behavior of *others*. The theory was first defined as the self-fulfilling prophecy, which Merton (1968) describes as "... in the beginning, a false definition of the situation evoking a new behavior which makes the originally false conception come true [p. 423]."

Rosenthal and Jacobson (1968), who coined the term *Pygmalian Effect*, demonstrated this in an elementary-school classroom. Randomly selected children who were identified to the teacher as "intellectual bloomers" showed a 4-point gain in IQ over the control children in 1 year. Although the early work of Rosenthal and Jacobson was criticized on methodological grounds, subsequent research has supported the existence of a Pygmalian Effect (Jones, 1977; Strom, 1971).

A key factor in the self-fulfilling prophecy is the teacher's (or other professional's) belief that he or she can bring about the desired change. To tell a student, "You can do it if you try," is not an example of the self-fulfilling prophecy. To believe, "I know I can help this student despite the obstacles he or she presents." is an example. This was exactly the attitude of the fictional character of Professor Higgins in *My Fair Lady*, and of Anne Sullivan, the very real teacher of Helen Keller.

Expectations of Oneself

Turning to the more self-directed types of expectancies, there are several currently active concepts, including locus of control (Rotter, 1966), personal causation (Bandura, 1977; deCharms, 1976; White, 1959), and learned helplessness (Seligman, 1975). Each of these concepts explains an aspect of the effect of personal expectancies on one's own behavior.

The concept of *locus of control* (Lefcourt, 1976; Phares, 1976; Rotter, 1966) refers to a person's expectancy regarding the controlling influences on reinforcements. A person who tends to assume that good grades, friends, promotions, and other reinforcements are most likely to result from personal effort and initiative is an *internally* oriented person. In contrast, an *externally* oriented person tends to believe that irrespective of one's efforts, beneficial consequences are largely a matter of circumstances, either good luck or the favorable decision of a power-holding individual.

Weiner (1974) incorporated the concept of locus of control into the broader concept of *attribution theory*. He also broadened the concept from control over reinforcements to control over outcomes of behavior. His research suggests that attributions of successes or failures to relatively stable factors such as personal ability or task difficulty, in contrast to unstable factors such as effort and luck, are better predictors of performance than locus of control. Locus of control, which combines the *internal attributions* of ability and luck, and the *external attributions* of task difficulty and luck, is sometimes a better predictor of affect than performance (Keller, Goldman, & Sutterer, 1978; Weiner, 1979).

Another approach to the concept of personal expectancies is that of *personal causation*, or personal effectiveness. White (1959) introduced the concept of competence as an organism's capacity to interact effectively with its environment. A fuller development of this general idea is provided by Bandura (1977). Bandura's concept of *self-efficacy* refers to the personal conviction that one can execute the behavior required for successful performance. It does not refer to the relationship between performance and outcomes, which Bandura calls outcome expectations. These distinctions are virtually identical to those of Porter and Lawler (1968) who differentiate between the subjective expectancies that effort will lead to performance, and that performance will lead to reward. The same distinction is included in the theoretical bases of the present chapter (see Fig. 11.1).

Of more central interest to educators is deCharms' concept of personal causation (deCharms, 1968), which deCharms developed as the origin–pawn concept. *Origins* tend to be active authors of their own behavior, whereas *pawns* are more reactive and tend to let their goals and habits be dictated by others. However, deCharms has worked at a practical level to develop and validate programs for teachers and students to develop a higher degree of origin behavior (deCharms, 1976). Further reference to deCharms' work is included later in the discussion of strategies.

The final concept included in this section is *learned helplessness* (Seligman, 1975; Keller, 1975). Learned helplessness develops when a person wants to succeed, and when the person cannot avoid the situation in which success is expected but is in fact impossible. For example, a child in beginning algebra might be daydreaming, absent, or distracted by either a fear or amusement of the teacher during the time when some essential premises and operations are presented. Subsequently the child, who cannot avoid going to algebra every day and who would like to succeed, begins to fail. It is truly impossible for the child to be successful at this point without additional information that the child does not even realize is missing. Consequently, the child develops the deep-seated conviction that, "I can't do math." The child perceives no relationship between his or her effort and what happens as a consequence. Once established, this condition is extremely difficult to reverse. However, the studies that have been completed in an educational context (e.g., Chapin & Dyck, 1976; Dweck, 1975; Murphy, 1979) suggest that the condition can be reversed, particularly when it is interpreted and treated in a context of attribution theory (Abramson, Seligman, & Teasdale, 1978; Dweck & Goetz, 1977).

Expectancy: Conditions and Strategies

The general motivational condition related to expectancy is that personal motivation will tend to increase with increases in personal expectancy for success. Furthermore, personal expectancy for success is influenced by *past experience* with success or failure at the given task, *locus of control,* and *personal causation*. Before proceeding, one qualification is in order. When a task becomes extremely easy, it is not unqualifiedly true that personal motivation will increase. If tasks are very easy, hence an extremely high personal expectancy for success, a person may become bored or simply uninterested because the task represents no challenge. (Recall that persons high on need for chievement prefer tasks with a moderate level of difficulty.) In contrast, there are situations in which people enjoy tasks that are easy and relaxing. The point is that positive, as opposed to negative, expectancies for success are positively correlated with actual success, especially when the perceived control of success is internal rather than external.

Despite the rather large amount of research on expectancies, there has been rather little research on how to influence expectancies in an educational context. Most of the research on changing expectancies has been in a clinical-psychology context (e.g., Rudestam, 1980) or commercial self-help books and workshops (e.g., Lakein, 1973; Ringer, 1977). The major study conducted in schools was that of deCharms (1976); and his concern, like that of the clinical and commercial contexts, was how to develop a greater sense of personal causation in children who tended to be very low, or external, in this regard. DeCharms was concerned with what might be called a trait change—that is, a change in the students' generalized expectancies of personal effectiveness.

In contrast, as indicated earlier, the present chapter is concerned primarily with *state* changes: how to design instructional environments to stimulate students by responding to the motivational characteristics that may be expected to exist in a typical group. Students may be expected to be more interested in a class, and to perform better, if the class is designed in a way that stimulates their feelings of personal *competence* and *control*. The following list of strategies are not intended to solve the problems of either the extremely external or highly obsessive student. Such a student would need specialized help from a counselor, not an instructional scientist.

The following strategies encompass a number of instructional-design techniques, including some approaches from the previously mentioned work of deCharms (1976). Whenever possible, research supporting a strategy is mentioned, but in several instances the strategies, although based on sound arguments, need empirical investigation.

Strategy 1. Increase expectancy for success by increasing *experience* with success.

This idea has a relatively long history of support in both theory and research. Rotter (1954) expressed the relationship in terms of generalized and specific

expectancies, and provided a mathematical representation in a subsequent article (Rotter, 1972). Without our getting into mathematics we can understand that Rotter suggests that expectancy for success in a given situation is a combination of one's *generalized* expectancy for success and one's history of success in *similar situations*. In unfamiliar situations, a measure of generalized expectancy of success (such as that of Fibel & Hale, 1978)—not to be confused with locus of control, which refers to the perceived internal versus external control of reinforcements—is the best predictor of performance. If a person has a generally low expectancy for success or a specific history of failure in a given area, then a *series of meaningful successes* in that area will improve the person's expectancy for success (Feather, 1965; Feather & Saville, 1967).

There is a qualification that needs to be mentioned in connection with this strategy. The goal of such a strategy is to increase positive expectancies so students will be more successful under normal classroom conditions. Consequently, the success experiences used to build positive expectancies must be *similar* to those in the transfer situation. Success on a series of trivially easy tasks will not help a student who is confronted with tasks perceived to be moderately or extremely difficult.

This strategy is similar to the principle of error-free responding (Markle, 1969) in programmed instruction.* The strategy is based on a cognitive rather than behavioral assumption with respect to feedback. In this case it is assumed that feedback serves to verify the correctness of a response, but it is the *cognition of success* that increases the expectancy for success. This is different from the motivational influence of a reinforcement, which serves to maintain a response as long as the reinforcer is an incentive for the learner. In the present case, the focus is on increasing positive expectancies. Reinforcers are discussed in the last section of this chapter.

Strategy 2. Increase expectancy for success by using instructional-design strategies that indicate the *requirements* for success.

There are several instructional-design strategies—or, to be consistent with the present theoretical approach (see Fig. 11.1), learning-design strategies—whose effects on learning, have had considerable research, but not their effects on motivation. Two of these strategies are advance organizers and objectives. It has already been mentioned how *comparative organizers* can help generate a sense of relevance. In addition, both *comparative* and *expository* organizers (Ausubel, 1968) may serve to increase a student's expectancy for success.** By obtaining the superordinate relationships, or subsumptive structures, that facilitate the acquisition of unfamiliar material by overviewing its structure (expository

*Editor's note: See also Gropper's theory (Chapter 5).

**Editor's note: This applies to the elaboration theory's *epitome* as well (see Chapter 10).

organizers) or the integration of new but similar material (comparative organizers), the learner's motivation should increase due to increases in positive expectancies. Research is needed regarding these potential motivational effects.

Similarly, the presentation of *instructional objectives* to learners should increase the expectancy for success provided that there is consistency between the objectives and the evaluation of learning. A further assumption is that the stated objectives are the true objectives of the learning situations. All too often, relatively trivial aspects of a learning situation are stated in the objectives simply because the designers lacked the skill or imagination to describe the important goals in observable terms. Given these assumptions, well-stated objectives should have the dual motivational effect of reducing anxiety and increasing positive expectancies. Here again, research on the motivational properties of objectives is needed.

Strategy 3. Increase expectancy for success by using techniques that offer *personal control* over success.

This strategy helps combine the concept of locus of control with expectancy for success. Strictly speaking, *locus of control* as developed by Rotter (1966) and others (e.g., Lefcourt, 1976; Phares, 1976) refers to the perceived internal versus external control over reinforcements. This implies something different from *expectancy for success* or failure, although the difference is not always clearly described. A person could have a positive expectancy for success at accomplishing a given task (e.g., "I will get that essay written by next Friday") and still have either an internal (e.g., "If I write it well, I'll get a good grade") or an external (e.g., "If the professor likes it I'll get a good grade") attitude towards reinforcement.

In essence, even though the two concepts are different, there is evidence that they are related. Internals tend to have a higher initial expectancy for success, especially with an unfamiliar task (Feather, 1965; Rotter, 1966). However, this difference tends to disappear with task experience.

The present strategy captures both concepts by suggesting that either personal control or predictable relationships (which is a form of control) over performance and reinforcement be established. An example of *personal control* would be individual contracting, assuming that the contract includes criteria for evaluation. An example of a *predictable relationship* would be mastery learning, again assuming that the mastery model is used properly with acceptable performance criteria specified.

Strategy 4. Increase expectancy for success by using *attributional feedback* and other devices that help students *connect success* to personal effort and ability.

This strategy is particularly important when a student does not perceive a connection between his or her effort and its consequences, as in learned helplessness. This strategy is also one of the more difficult to implement, because it requires special attention from the designer and teacher.

Much of the nondirective approach of Rogers (1969) and the personal-causation approach of deCharms (1976) is concerned with helping students *develop internal attribution* for success and failure when such attributions are in fact appropriate. Both approaches emphasize the development of personal responsibilty and self-directedness. Rogers works in a context of human potential development and deCharms in a context of achievement motivation, and both authors have a number of specific suggestions for curriculum-design strategies. Those of deCharms (1976) are particularly helpful because concrete classroom activities are described. A similar approach to presenting Rogers' work in terms of concrete procedures is found in Weil et al. (1978).

A different and more direct approach to implementing this strategy requires the *direct intervention* of a teacher or tutor at an appropriate point. For example, a person who has developed a *learned-helplessness* attitude towards a particular subject simply does not perceive any causal link between behavior and its consequences. This person will tend to give an external attribution for success or failure. In math, this person will work on problems if they are easy, but will quit when the problems become challenging. This person often does not see the connection between ability and persistence as the key to success. In this situation, the designer must develop a sequence of problems (or other assignments depending on the context) that are *initially easy but become challenging*.* After each success, the teacher gives *encouragement* to keep trying, and after success at the more difficult problems, the teacher gives verbal, *attributional feedback*. The student is told something like, "See, you succeeded because you kept trying. You are able to do that." Ordinarily it would take many such experiences to overcome a deep-seated helpless attitude. This approach has been demonstrated by Dweck (1975) in a mathematics context, and, with considerable revisions to fit the context, by Murphy (1978) in reading.

In summary, perceived expectancy of success is one of the two basic components of the basic expectancy-value theory of motivation. Jones (1977) has reviewed the research on expectancies, self-fulfilling prophecies, and the conditions related to the development of positive or negative expectancies. This research, incorporating both human and infrahuman subjects, supports the conclusion that *positive expectancies* lead to improved performance and success rates. A key factor in this principle is that the positive expectancies are not necessarily consistent with actual, or objective, predictions of success. Believing something can, apparently, help make it happen.

This principle, which is pushed to the unrealistic extreme in contexts such as "sales seminars" or by the "success merchants," is not advocated to the exclusion of the other motivational principles. *Excessive confidence* in success can lead to a narrowness of focus and an insensitivity to interpersonal feedback. Both of these consequences can interfere with the other motivational components of curiosity

*Editor's note: This easy-to-difficult sequence is an important part of Gropper's theory (Chapter 5) and Merrill's theory (Chapter 9).

and need satisfaction. However, it is seldom the case that students suffer from an excess of expectancy for success. Well-designed instruction should promote this perception.

OUTCOMES

The Concept of Outcomes

This category includes several specific factors that influence the satisfaction of goal accomplishment and the motivation to continue pursuing similar goals. It is assumed here, following the theory presented at the beginning of this chapter (see Fig. 11.1 for a representation); that both intrinsic and extrinsic outcomes follow a given performance. The *extrinsic outcomes* result from environmental controls and circumstances, and the *intrinsic outcomes* result from one's internal emotions and evaluations in response to the performance, the extrinsic consequences, and the relationship between them (Adams, 1965; Deci, 1975). The results of this cognitive evaluation feed back to motives and values, and thereby influence the motivation to continue to do the same kind of activity (see Fig. 11.1).

For example, a student, Deborah, may feel elated immediately after giving a speech in front of a class. She is elated because she remembered her entire speech and delivered it without fainting. A few minutes later her extrinsic "reward" from the teacher is being told that she was tense, barely audible, and obviously unrehearsed. Unless Deborah is an unusually stalwart person, or is driven by very powerful long-range goals, her intrinsic satisfaction has just been converted to embarrassment and, depending on her temperament, either shame or anger. The motive, or value, she attaches to this activity has been depressed and will survive only if there are other, overriding values for success in this activity. Furthermore, her subjective expectancy for success, with respect to the relationship between performance and consequences, has been reduced.

From a behavioral point of view, this example is a rather straightforward illustration of the interaction of internal and external consequences and evaluations of behavior. In a sense, it is simply an example of punishment, or a directly applied aversive consequence of behavior. However, in this case the relatively complex cognitive explanation might be preferable to a more parsimonious behavioral explanation. Recent research in intrinsic motivation versus extrinsic reinforcement suggests that there are a number of situations, similar to the preceding example, that are not explained satisfactorily by the more reductionistic behavioral theory (e.g., Bates, 1979; Condry, 1977; Deci & Porac, 1978). Space does not permit a thorough explication and review of the two positions, so the remainder of this section contains a brief overview. The next section, concerned with conditions and strategies, includes some of the principles that have been most heavily investigated and seem to have the most practical applicability.

Operant-conditioning theory assumes that behavior is controlled by its consequences. When a particular behavior is reinforced positively, it will increase in rate relate to a baseline, or nonreinforced, rate. Furthermore, if a variable-ratio reinforcement schedule is used, the behavior will persist for a relatively long time after reinforcement stops. However, once reinforcement terminates, the behavior will extinguish, which means that the rate of response will return to the baseline or slightly above it. Countless laboratory experiments confirm this observation (cf. Travers, 1977).

Despite the heavy support of conditioning principles, there are a growing number of observed situations that are not effectively explained by conditioning theory.* This is not surprising, as Kuhn (1970) has so aptly described, because the more rigorously we develop and apply a theory and its associated principles, the more we begin to notice the anomalies. For example, several studies have found conditions under which the removal of extrinsic reinforcement resulted in a decrease in response rate to *below the baseline* for the given activities (for reviews, see Bates, 1979; Condry, 1977; Deci, 1975). Typically these studies involve three phases. In Phase 1, subjects are observed working on fairly absorbing complex tasks such as solving puzzles, generating newspaper headlines, or creating artwork. An unobtrusive measure of time on task is obtained. In Phase 2, the subjects are given an extrinsic reinforcement such as praise or money for given units of performance. Then, in Phase 3, subjects are observed unobtrusively during a second period of "free play" with no extrinsic reward. During this second free-play period, the target behavior decreases significantly below the original baseline. Having controlled for fatigue and other sources of confounding, the researchers concluded that for some types of activity, *extrinsic reinforcement can decrease intrinsic motivation*..

This is not a new idea. Quite a number of researchers have commented on and studied the deleterious effects of extrinsic contingencies on intrinsic motivation and self-initiated, exploratory behavior (e.g., Festinger & Carlsmith, 1959; Harlow, 1953). However, a recent approach (Deci, 1975), especially in conjunction with the work of Condry (1977), is particularly appropriate for the overall approach of the present theory. Deci (1975) presented three propositions in support of cognitive evaluation theory. It is worth examining these because they form the basis of several strategies to be presented, and they form a linkage between this and earlier sections of the chapter.

The first two of Deci's propositions describe conditions that reduce intrinsic motivation. The first states that intrinsic motivation decreases as the perceived

*Editor's note: Contrary to the attitudes of some instructional scientists, the clear implication here is that we should not "throw out" such validated knowledge just because it cannot explain all phenomena. Different theoretical perspectives are like diffeent windows that allow one to look inside a mysterious house.

locus of causality shifts from internal to *external*. The second proposition states that there will be a decrease in intrinsic motivation if a person's feelings of *competence and self-determination* are *reduced*. The explanation for the relationship of external rewards to these two propositions lies in the third. It says that every reward, including feedback, has two elements, a controlling element and an informational element. If the controlling element is dominant, it will influence the perceived locus of causality. If the *informational element* is *dominant*, the influence will be a feeling of competence and self-determination. It is the controlling influence that is often responsible for the decrease in intrinsic motivation.

The research on intrinsic versus extrinsic motivation is still in somewhat of a formative state, and some of its findings are subject to criticism (Bates, 1979). Even so, there are several results that lead to prescriptions for strategies of instructional design and delivery. The following section contains several strategies concerned with the appropriate use of reinforcement for motivation and maintenance of intrinsic motivation.

Outcomes: Conditions and Strategies

The complexity of this section, caused in part by the number of sometimes conflicting propositions that must be accommodated, makes it difficult, if not impossible, to derive a single, guiding principle, except at a very abstract level. It is possible to state that to develop and maintain personal motivation for a given activity, *use reinforcement*, but do it in such a way that the controlling influences do not detract from the *intrinsic* satisfactions. This statement is intended to embrace standard reinforcement principles as modified by the research on intrinsic motivation.

The remainder of this section is concerned primarily with strategies based on the intrinsic-motivation research. The reason for this is practical, and not because of theory or personal biases of the author. Design principles based on reinforcement, or conditioning, theory have abounded in the literature of instructional technology for many years (Gagné, 1977;* Markle, 1969, 1977). Therefore, apart from some recent and not widely disseminated work of Tosti (1978), that work will not be repeated here.

Strategy 1. To maintain intrinsic satisfaction with instruction, use *task-endogenous* rather than task-exogenous rewards.

Typically, one of the first questions asked in regard to intrinsic motivation is something like this: "If external rewards decrease intrinsic satisfaction, then how do you explain the effects of wages on job satisfaction?" The research on intrinsic motivation does not suggest that external rewards always imply external control with a reduction in intrinsic motivation. As previously indicated, a distinction is

*Editor's note: See also Chapter 4.

made between "controlling influence" and "external reward." Both Condry (1977) and Bates (1979) point out that an *endogenous reward* tends not to be perceived as having a controlling influence. An endogenous reward is one that customarily or naturally follows from a task. For example, a scientist participating in a "think tank" expects to be paid for his or her labor. However, the remuneration does not control the manner in which the scientist behaves. The scientist is free to speculate, task risks, and make personal decisions about how to spend his or her time.

In contrast, in some university departments, a university professor's annual salary increase is tied directly to the number and type of publications that he or she produces each year. This is an *exogenous-reward* situation. Research is not usually conducted on the basis of how many publishable articles it yields each year. It is generally approached with the idea that time is secondary to the requirements for valid inquiry aimed at finding the true consequences of given assumptions. Therefore, it is somewhat artificial to attach financial rewards to specific, arbitrary indictors of the rate of research that one reports. In this case, the exogenous reward might be expected to decrease intrinsic interest in research even though the quantity of research might increase for as long as the reinforcement system was operating, but the quality of research might decrease.

This seems to be a frequent finding despite the traditional assumption in behavior modification that clients, or students, would move from extrinsic to intrinsic reinforcers as a desirable behavior became established. In token-reinforcement systems, for example, desired behaviors, including both learning and classroom behavior, improve while the token system is in effect, but tend to extinguish rapidly when it is withdrawn (Kazdin, 1973; O'Leary & Drabman, 1971). Also, Levine and Fasnacht (1974) found that the use of tokenjs for rwards not intrinsic to the task led to decreases in self-initiated problem-solving behavior and less innovative solutions.

Of particular interest to designers and teachers in this regard is the work of Kruglanski, Riter, Amitai, Margolin, Shabtai, and Zaksh (1975) who report two studies using money-intrinsic and money-extrinsic tasks. These authors found that when monetary rewards (real or simulated) were normally associated with an activity such as coin tossing or a stock-market game, subjects gave higher ratings of continued interest when the rewards were paid than when not. Similarly, in money-extrinsic conditions such as athletic games and achievement activities such as a block-building game, subjects expressed greater continued interest when no monetary rewards were used.

The implication of this strategy is that extrinsic rewards should be *used selectively* and with consideration to the *nature of the task* to be reinforced. The remaining strategies in this section offer guidance as to the types and timing of various types of intrinsic and extrinsic reinforcers.

Strategy 2. To maintain intrinsic satisfaction with instruction, use *unexpected, noncontingent* rewards rather than anticipated, salient, task-contingent rewards (except with dull tasks).

A number of studies have shown that extrinsic rewards are not as likely to decrease intrinsic interest if they are *unexpected* rather than expected (Greene & Lepper, 1974; Lepper & Greene, 1975; Lepper, Greene & Nisbett, 1973), and in some cases, if they are *noncontingent* rather than being tied to a specific performance criterion (see Bates, 1979, and Condry, 1977, for reviews). Similarly, Ross (1975) found that highly *salient* rewards, such as having the anticipated reward on a table in front of the subjects while they worked on a task, tended to decrease intrinsic interest.

There are, as one might expect, complexities and inconsistencies in this active area of research that require qualification of these simply stated principles, even though there seems to be a fair degree of support for them. For example, Calder and Staw (1975) found that rewards can increase interest in *dull tasks.* And, Kruglanski, Alon, and Lewis (1972) found that even unexpected rewards can decrease intrinsic motivation when the task is a type that is *often associated with reward*. Finally, there is a discrepancy between this strategy and the previous one, which included the observation that rewards inherent to the task content can increase intrinsic motivation (Kruglanski et al., 1975).

Despite these problems, it seems reasonable to conclude that designers and teachers should be particularly cautious about using expected, contingent, extrinsic rewards for tasks that do not typically have an inherent extrinsic reward. If there is a desire to use extrinsic rewards under these conditions, it would perhaps be better to use them in an unexpected and noncontingent manner.

Strategy 3. To maintain intrinsic satisfaction with instruction, use *verbal praise* and *informative feedback* rather than threats, surveillance, or external performance evaluation.

The preceding strategies have been primarily concerned with the conditions of reinforcement. In contrast, this strategy is more concerned with the types of *consequences* that will enhance or suppress intrinsic motivation. This also happens to be one of the more heavily researched areas of intrinsic motivation. Reviews of this research are provided by Bates (1979), Condry (1977), and Deci (1975). Again, as in the previous strategies, there tends to be a common theme despite the difficulties in interpreting and comparing the various studies. Intrinsic motivation tends to flourish to a far greater extent in a context of positive but *noncontrolling consequences* than when excessive evaluation and aversive forms of control are used.

For example, when working in a context that puts one before an audience frequently, as in the role of a teacher or professor, one can become as irritated with positive as with negative feedback. An educator must deal with many audiences including individual advisees, classes of students, principals or deans, consulting clients, and promotional review boards. The feedback from these various groups can sometimes serve to indicate that one's every move is being evaluated, and that can be irrtitating even when the results are positive. Similarly, the student's relationship to education, especially during the first 12 grade levels, is dominated by

the evaluative role of the teacher. Indirectly, the instructional designer is part of this process, because the predominant modes of instructional design include *heavy doses of performance evaluation*. Consequently, it is not difficult to see at least part of the reason for the difficulty in maintaining the intrinsic interest of children in the school process.

A challenge for designers and teachers is to find ways of utilizing these strategies to maintain intrinsic motivation while meeting the sometimes rigid and competitive performance criteria that society and state education departments place on the schools. The two remaining strategies offer somewhat more specific advice in regard to operationalizing two aspects of these strategies.

Strategy 4. To maintain quantity of performance, use *motivating feedback* following the response.

This traditional reinforcement principle, even with the modifications suggested in the preceding strategies due to intrinsic-motivation research, is still a powerful principle with a great deal of relevance. We are much more likely to repeat behaviors that have *pleasurable consequences* than those that do not. Additional discussion of this strategy, which becomes more interesting when contrasted with the following strategy, is included in the following Strategy 5 discussion.

Strategy 5. To improve the quality of performance, provide *formative (corrective) feedback* when it will be immediately useful, usually just *before* the next opportunity to practice.

Tosti (1978) uses the terms *motivational* and *formative* to describe the traditional distinction between the two most frequently used types of feedback in learning and performance situations. The first, motivational, refers to positive reinforcement following a desired response. This could be praise for a student who finished an assignment or for a salesperson who sold a car, or it could be something tangible such as money or a grade. This type of feedback primarily affects the *quantity* of performance. It is the primary formulation of contingency management, and it signals that repetition of the same behavior is desirable.

The second type of feedback is formative; it is used to affect the *quality* of performance. In this sense, it signals a gap between the given versus a preferable performance, and it indicates the actions to take to close the gap. Consequently, formative feedback serves as a *correctant,* and it can produce rapid changes in behavior in contrast to the more tedious process of using shaping techniques with motivational feedback as a means of producing qualitative changes in behavior.

Typically these two types of feedback are used together, the first to encourage continued effort, and the second to encourage and assist improvements in quality. However, as observed by Tosti (1978), there are individual differences in style, and, as observed in subsequent research, differences in the effective use of the two types of feedback. When a student hands in a paper, some teachers will make a complementary comment such as, "I'm happy you finished. Your paper looks

nice." Others would offer more corrective information such as, "You have missed some items. Here, let me show you your problem." Others, and this applies to supervisors in many contexts, not just teachers, mix the two types of feedback. This approach is easy to recognize because it always contains the word *but*, or a surrogate. For example, "I'm so pleased to see that you finished, but you do have a problem here." Or, "You did an excellent job of formulating these objectives for the math curriculum, but I would like for you to change the format." In both cases, the corrective feedback tends to *cancel the positive effect* of the motivational feedback.

How do we resolve this problem? Tosti suggests that the *timing* of feedback is critical. Motivational feedback should be given *immediately after* a performance, and should refer to those aspects of the performance criteria that were acceptable. In contrast, formative feedback should relate to those aspects of performance that are less than standard, and should be delivered *when it is immediately useful* (i.e., just before the next performance). In a telephone-sales organization, for example, the managers would listen to randomly selected calls and give the operators feedback on their performance at the end of each day. This use of feedback, following the traditional behavioral-modification pattern of immediate reinforcement, had little effect on the performance of the workers. When the corrective feedback was delayed until the beginning of the next day, performance improved dramatically.

Instructional designers and teachers would probably benefit from a similar application of this strategy. It is seldom the case that formative feedback is immediately useful just after a performance. An exception would be those situations in which a series of rehearsals or supervised practice exercises precede a final performance as in drama, athletics, and programmed instruction. More often, especially in academic subject areas, an assignment is given with, perhaps, some general advice or instruction on how to do the assignment, but no individual feedback on a student's *characteristic problems* with respect to successful performance. How many students who have trouble articulating the main idea in a prose passage receive personal guidance *just prior* to applying that skill? The appropriate use of formative feedback as suggested in this strategy statement underscores the need for a cumulative file for each student that is used for feedback purposes at the appropriate time. This would, of course, require extra work for teachers in the short run, which could probably be facilitated with a computer-management system, but if the performance improvements were substantial, there should be a long-range savings in teacher effort. Additional insights into teachers' uses of feedback is included in Brophy and Good (1970) and Cooper (1977).

In summary, the conclusions are far from being complete regarding intrinsic satisfaction and extrinsic reward. The precedinbg strategies reflect some of the recent research findings, and must now be operationalized and tested in terms of prescriptive design strategies. There seems to be little doubt that the emotional, attitudinal, and tangible consequences of a behavior will influence one's motivation to continue at that activity. However, the exact characteristics of these influences on

each other and on continuing motivation require much additional study. From an instructional-design perspective, it is important to consider both the intrinsic and extrinsic consequences of our design strategies.

CONCLUSIONS

In summary, the present model uses the four categories of curiosity, relevance, expectancy, and outcomes to summarize research on human motivation, and to identify several strategies for generating motivation. Furthermore, these categories are derived from a macro theory of the relationships of individual and environmental characteristics on effort, performance, and outcomes (see Fig. 11.1).

There are a number of potential benefits of the present model for instructional science and instructional design, and there are some specific limitations. One of the benefits is that the model provides *four reasonably specific categories** of variables that help synthesize many of the lines of research concerned with motivation. This synthesis facilitates the development of applied-research projects because it helps identify several of the major sources of variance that operate simultaneously in a field setting. research on instructional design has to have external validity if it is to be of any use to designers. This means that major sources of variance have to be understood, not just controlled, in order to develop prescriptive strategies with descriptions of the conditions under which they will and will not work. Principles that require unrealistic controls simply are not useful. Newton's physical laws were a boon to theory, but their practical utility was limited, because they were unqualifiedly true only in a frictionless environment. Schools are, metaphorically speaking, anything but frictionless.

The present model appears to have heuristic value in that it incorporates specific categories of variables in a theoretical context that facilitates the development of research that has direct implications for motivational design. Several dissertations have been completed, and others are in progress (Keller, 1981) that were developed in the context of this model. Several of these studies are focusing on the development of prescriptive design strategies.

However, a limitation of the model, and of the state of the art in research in this area is the *lack of specific, prescriptive strategies*. The amount of research on motivation is vast, and the conditions that influence motivation are difficult to specify in concrete terms. A strategy that works today might not work tomorrow because it loses its novelty effect. Yet, it is shallow to assume that novelty has to always be present to stimulate and maintain motivation. The enduring characteris-

*Editor's note: These categories may correspond to Gropper's *obstacles* to meeting *learning requirements* (see Chapter 2). In this case, Gropper's suggestion that "whether an obstacle is treated" is more important than "how it is treated" could result in an instructional theory that specifies a menu of alternatives for treating each of Keller's four motivational requirements for appealing instruction.

tics of people and of instructional materials that contribute to sustained motivation are the ones that we want to capture. As we are able to do this in a systematic fashion, we will more frequently be able to make school appealing, even engrossing, as inspired teachers presently do.

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Unit III

COMMENTARY

This Unit provides commentary on instructional theory in general and on each of the particular theories presented in Unit II. Chapter 12's major contribution is some insightful *perspectives* on instructional theory: its producers and users, its history and some of its contemporary issues, its individual theories as represented in this book, and implications for its future. Of particular interest are discussions of: (1) the need for systematic synthesis of facts about instruction; (2) the role of personal values and prejudices in the constitution of instructional theory; (3) the relationship of instructional psychology to instructional theory; (4) skepticism as to whether comprehensive theories of instruction can in fact exist at all; (5) the need for systematic procedures for utilizing scientific knowledge to solve practical problems; (6) the tendency to select and restrict oneself to a single theory or theoretical orientation; (7) whether in fact any of the preceding chapters represents a true (comprehensive and valid) instructional theory; (8) the need for support for both the production and the utilization of better knowledge about instruction; and (9) the influence that the growing use of micro computers in education is likely to have on instructional theory. Discussion of these topics is complemented by an insightful commentary, comparison, and contrast of the individual theories described in earlier chapters of this book.