

ROBERT M.  
GAGNÉ

# THE CONDITIONS OF LEARNING

AND THEORY OF  
INSTRUCTION

FOURTH  
EDITION

# The Conditions of Learning

## and Theory of Instruction

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# Preface to the Third Edition

There have been many new research findings and theoretical developments since the publication of the second edition of this work. In addition, I have undertaken in the intervening years to examine what is known about learning conditions for five varieties of learning outcomes, some of which were only very briefly mentioned in previous editions. The emphasis in the present edition on interpretation of learning events in terms of the information-processing model will not come as a surprise to readers acquainted with my recent writings. I consider this form of learning theory to represent a major advance in the scientific study of human learning.

The considerable shift in orientation from its previous edition requires a very different organization for this one, and has occasioned its being largely rewritten to include much new material. This book, I feel, deserves a preface which is both frank and more than usually detailed.

In seeking to describe the conditions that affect human learning I have had in mind the question: What factors really can make a difference to instruction? The answer to this question is framed within two different themes that run throughout the book. The first of these themes is *varieties of learning outcomes*. A serious consideration of practical knowledge of learning, I believe, must go beyond the most general principles of the learning process, such as contiguity and reinforcement. One must recognize that learning results in retained dispositions which have different properties, different organizations, and which accordingly require that different conditions be established for their attainment. I call these learned dispositions by the general name of *capabilities*. Their five main varieties are called intellectual skills, cognitive strategies, verbal information, motor skills, and attitudes. Learning investigators and theorists often use these categories (not

always by these names) in their accounts of learning—they are not entirely unfamiliar. Yet these same investigators often do not choose to make these distinctions explicit, as is done here. It should be noted that these five kinds of capabilities do not have simply ordered relationships with one another; and they are discussed in the order named mainly for convenience in presentation. As for how one kind of capability relates to another kind, that is a matter discussed within several chapters of the book.

The second main theme relating to the factors that make a difference to instruction may be identified as the *events of learning*. The description of these events begins with an account of the information-processing model of learning and memory, as posited by a number of contemporary investigators as a framework for learning research. This model, with its broad outlines of structures and processes, is shown to be both useful and illuminating as a basis for conceptualizing the conditions of learning. From the model, and from existing evidence regarding its functioning, one may form a description of conditions affecting the processes of learning and remembering. These conditions, some of which are internal to the learner and some external, make up the events of learning. Those events which are external, when deliberately planned and arranged, constitute *instruction*. Thus it is reasonable to define instruction as being made up of events external to the learner which are designed to promote learning.

The criterion of educational relevance for knowledge about learning results in a content which I recognize to be somewhat untraditional. Psychologists who study learning derive their problems for investigation from a variety of sources, not all of which relate to education. Sometimes, too, an original problem source which may have been educational in nature has over a period of years been virtually lost sight of, while the problem itself has become subtly altered in its definition. As a consequence, one cannot simply or automatically assume that names for topics in learning research (such as “verbal learning,” “concept identification,” “reasoning,” and so on) are closely relevant to an understanding of planned instruction. By saying this, I do not mean to deprecate such research, which often has the most worthy purpose of finding explanations for general characteristics of the learning process. Selection of research findings for this book on the basis of their relation to instruction, however, is not the same as answering the question: What have investigators of learning been studying?

The book is addressed to a fairly broad audience and, it must be supposed, one which is heterogeneous in prior knowledge. I hope, first, that it will be used by those who are preparing for, or already pursuing, the teaching profession. Students in this category will need to acquire many new concepts and principles about learning and about their applications to education. This group of readers, I trust, will be rewarded by gaining a set of internalized models of human learning and instruction into which they will be able to incorporate the most important features of their varied experience with the practical affairs of teaching and learning.

A second group of students for whom the book is intended is of somewhat mixed composition, although possessing common goals. These are students of education who see their future careers as being concerned with educational management in its broadest sense. They may have teaching specialties in particular content areas, such as language, mathematics, science, or social studies. They may have chosen to orient their careers toward the establishment of educational quality in elementary, secondary, post-secondary, or adult education, or in vocational or industrial training. A knowledge of human learning is of value in all of these pursuits. Such knowledge is relevant to the practices of education that are known by such names as curriculum planning and development, instructional systems design, assessment of learning outcomes, and program evaluation. Educational leadership which includes a concern for the quality of instruction and the competence of student graduates must take into account the conditions of human learning and the means available for establishing them. Students of education in these varied fields will, I believe, profit from an understanding of learning conditions as described in this volume.

A substantial segment of the book's intended audience is expected to be composed of students of educational psychology at both undergraduate and graduate levels. For these students, a word of orientation perhaps needs to be said. The psychology of learning described in this book represents that body of theoretical and empirical knowledge about learning which, in my view, is most highly relevant to education. The selection of this knowledge has been made against the criterion of relevance to what I perceive to be taking place in classrooms or other places where deliberately planned instruction occurs. There is, in addition, some information which provides a historical-intellectual background, occurring chiefly in Chapters 1 and 4. This may be reviewed very briefly, or skipped, by students of educational psychology if it is already familiar to them. Otherwise, the contents of the book present an organization of knowledge about human learning that I consider worthy of appreciation by the student of educational psychology, and most promising as a basis for future research.

Naturally, it would please me as an author to learn, as this book is put to use, that students of a variety of backgrounds and interests in education have found it possible to acquire an organized schema of human learning as it occurs in situations of instruction. While I would expect each such student to contribute his or her own interpretations and amendments, I would nevertheless anticipate that such a schema will be valuable as a referential model against which the complex events of teaching and learning can be compared and evaluated.

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FOURTH EDITION



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# 1

## Introduction

The fellow human beings we know and associate with got the way they are largely because of learning. Their habits of living have been learned and can be changed by learning; so too can their stores of knowledge, their skills, and the human qualities that characterize them as individuals.

Adult human beings are marvelously adaptable, competently functioning persons. How they managed to progress from their beginnings as highly dependent and relatively incapable infants to such an advanced state is a question of great intellectual interest and importance. One part of the answer, to be sure, lies in human genetic makeup and in an understanding of the process of development through growth. The other part, relating to a different set of circumstances in the life of the individual, is learning. Human skills, appreciations, and reasonings in all their great variety, as well as human hopes, aspirations, attitudes, and values, are generally recognized to depend for their development largely on the events called learning.

One may, if one wishes, cease to wonder about learning at this point, having confirmed to one's own satisfaction that human development in all its manifestations must depend on the twin factors of growth and learning and their interactions with each other. One can say about a child, "He'll learn," just as one says, "She'll grow into it (or out of it)," and such statements are difficult to deny. But to consider learning and growth merely as natural events is to overlook the most important difference between them. The factors that influence growth are to a very large extent genetically determined, whereas the factors that influence learning are determined chiefly by environmental events. Once a person's genetic stock has been chosen at the moment of conception, growth cannot be altered very much, except by extreme measures. But members of human society, which itself is responsible for the care of a developing person, have a tremendous degree of control over events that affect learning. Experience, we are told, is the great teacher. This means that the events the developing person lives through—at home, in the geographical environment, in school, and in various other social environments—will determine what is learned and therefore to a large extent what kind of person he or she becomes.

This enormous dependence of learning on environmental circumstances implies a great responsibility for all members of human society. The situa-

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tions in which developing children are placed, whether deliberately or otherwise, are going to have great effects on them. In fact, there is not a very clear understanding at present of what the limits of these effects may be. Are the situations in which the growing person is nowadays customarily placed the sort that will encourage the development of disciplined thinkers, of great artists and scientists? Or will they discourage such development and inhibit the full exploitation of human thought and intellect?

The realization that learning is largely dependent on events in the environment with which the individual interacts enables us to view learning as an occurrence that can be examined more closely and understood more profoundly. Learning is not simply an event that happens naturally; it is also an event that happens under certain observable conditions. Furthermore, these conditions can be altered and controlled, and this in turn leads to the possibility of examining the occurrence of learning by scientific methods. The conditions under which learning takes place can be observed and described in objective language. Relations can be detected between these conditions and the changes in human behavior that occur in learning. Thus we can make inferences about what has been learned. Also, scientific models and theories can be constructed to account for the changes observed, just as for other types of natural events.

### Learning and Its Conditions

This book is about the *conditions of learning*. We shall consider the sets of circumstances that obtain when learning occurs, that is, when certain observable changes in human behavior take place that justify the inference of learning. A number of different kinds of changes brought about by learning will be described and related to the situations in which they occur. We shall not present a theory of learning but will draw some general concepts from various theories. Our major concern is to find a reasonable answer to the question, What is learning? This answer is to be phrased in terms of an objective description of the conditions under which learning takes place. These conditions will be identified, first of all, by reference to the situations of ordinary life, including those of the school, in which learning occurs. Their identification will also be aided in certain instances by reference to experimental studies of learning.

*Learning is a change in human disposition or capability that persists over a period of time and is not simply ascribable to processes of growth.* The kind of change called learning exhibits itself as a change in behavior, and the inference of learning is made by comparing what behavior was possible before the individual was placed in a *learning situation* and what behavior can be exhibited after such treatment. The change may be, and often is, an increased capability for some type of performance. It may also be an altered disposition of the sort called *attitude* or *interest* or *value*. The change must have more than momentary permanence; it must be capable of being re-

tained over some period of time. Finally, it must be distinguishable from the kind of change that is attributable to growth, such as a change in height or the development of muscles through exercise.

## The Elements of the Learning Event

Students in the sixth grade may learn to write sentences which use the participial form of verbs to modify the subjects of sentences, as in the example, "Seeing no obstacles, he went ahead with the plan." By such learning, they may acquire an alternate way of expressing thoughts which otherwise would require a separate clause, such as "Since he saw no obstacle, he went ahead with the plan." When they have learned to the extent that they can use this alternative, learners should have no difficulty in turning sentences with clauses into sentences which use participial phrases, and vice versa. In addition, they will readily be able to detect the incorrectness in a sentence such as "Trying to catch up, the tight skirt slowed Ruth's progress." In other words, learning has made it possible for students to use a new form of a sentence correctly, whatever its content may be.

How has this learning been brought about? What are the elements of the situation that can be abstracted as having to do with learning?

1. First there is a *learner*, who is a human being (it would be possible for the learner to be an animal, but that is another story, or more exactly, several others). Learners possess sense organs, through which they receive stimulation; brains, by means of which signals originating in the senses are transformed in a number of complex ways; and muscles, by means of which they demonstrate what they have learned. The stimulation that is constantly being received is organized into various patterns of neural activity, some of which are stored in the learner's memory in such a way that they can be recovered. Such memories may then be translated into action that may be observed as the movement of muscles in executing responses of various sorts.
2. The events that stimulate the learner's senses are spoken of collectively as the *stimulus situation*. When a single event is being distinguished, it is often called a *stimulus*.
3. Another important input to learning consists of content recovered from the learner's *memory*. Such content, of course, has an already organized form which has resulted from previous learning activities.
4. The action that results from these inputs and their subsequent transformations is called a *response*. Responses may be described more or less specifically. For example, one can speak of the movement of a particular muscle or of the action of the whole body in walking. For this reason and others, responses are often described in terms of their effects rather than in terms of their appearances. When so classified, they are called *performances*. For example, a response might be the movement of the finger



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rhythmically over a small area of the scalp. But it may often be more useful to refer to the performance of scratching the head.

A learning occurrence, then, takes place when the *stimulus situation* together with the *contents of memory* affect the learner in such a way that his or her *performance* changes from a time *before* being in that situation to a time *after* being in it. The *change in performance* is what leads to the conclusion that learning has occurred.

At this general level of description, the student's learning to use a participial phrase correctly may be said to have come about in the following way. Before the learning, the students' performances in writing sentences showed no tendency to use participial phrases. Then a stimulus situation was introduced, which may have included a teacher who used verbal communications to get the students to attend to certain stimulus features of sentences and to make certain responses to them. A number of different sentences, some containing participles and some not, were also used as part of the stimulus situation. Students were required to recover certain concepts from memory, such as "subject," "modifier," "phrase," and "participle." A sequence of stimulus events was made to occur, at the end of which the students succeeded in using participial phrases and in distinguishing a sentence containing such a phrase from one using a clause. The teacher then verified that learning had taken place by asking the students to repeat their performances with some additional examples. The performance was again successful, and the inference was made that learning had taken place. What had been produced by this activity was a new *capability*, to be stored in the learner's memory.

This example is markedly oversimplified, of course. But the framework for the events of learning exhibits a constant set of elements. External to the learner is the stimulus situation, which may initiate and influence learning. Internally, the learning is affected by organized contents recovered from the learner's memory. Various transformations of these inputs result from internal processing and finally exhibit themselves in the learner's performance. As our discussion of the conditions of learning proceeds, many occasions will call for reference to these elements of the set of learning events.

This brief introduction to the events of learning shows that there are two main ideas that need to be understood. First is the question of *what is learned*. It is generally believed that the most elementary unit produced by learning is the *association*, which is established when two events (or ideas) occur together and become mentally linked. From such units, in a manner that is by no means clearly understood at present, are built up the new *capabilities* that make possible the great variety of human performances. For example, individuals learn capabilities that underlie the performance of reading, other capabilities for automobile driving, and so on. These learned capabilities possess different levels of complexity in their organization. If we