11 When a nonhuman resource serves as planner

The most efficient way to learn certain knowledge and skill is to rely on a carefully designed program, set of materials, or other nonhuman resource. This object will then determine the detailed content and procedures for each learning session. Instead of making frequent decisions about what and how to learn in the next episode, as in a self-planned project, the learner can follow the path set by the program or object.

Relatively few learning projects have an object as the planner, according to our 1970 survey. It is much more common for the learner to handle the day-to-day planning himself, to rely on a group or its leader, or to rely on a person in a one-to-one situation.

Some Examples of Nonhuman Planners

In some learning projects, the plans are provided by a special kind of book. In learning to type, for example, a person may follow the sequence of content and practice exercises presented by a teach-yourself-typing book. Someone who wants to learn French or introductory psychology might seek the orderly progression and exercises provided by a textbook. Several books present an effective sequence of explanations and practice exercises for those who want to increase their reading speed. Some persons rely on a guided or packaged reading program in which they read a set of books in a certain order. In each of these examples, the learner lets a book (or a set of books) determine the detailed sequence of content, exercises, and other learning activities.

Various types of programmed instruction are now available to provide even more detailed control over the learning activities, and to provide frequent feedback and reinforcement. Programmed materials are available for persons who want to learn bridge, science, algebra, basic English, parliamentary procedure, grammar, and a wide variety of other subject matter. Some programs are in book form, either scrambled or with frames; others require a teaching machine of one sort or another. With programmed instruction, the learner usually sets his own pace and learns the

material thoroughly, though with many programs he cannot control the sequence, skip material, or backtrack.

Some courses, library centers, schools, and colleges now rely primarily on programmed instruction for both credit and noncredit learning. Part of the subject matter may be presented by supplementary audiovisual devices; in certain training and stimulation devices the audiovisual portion is even more important than the printed portion. In addition, reference materials and a teacher for answering specific questions or dealing with difficulties may be provided.

Computers are increasingly being combined with programmed instructional materials. The computer can present "printed" material (or even audio and visual material), evaluate responses, and use the learner's response history for choosing particular branches or sequences of material. Several experimenters are working toward a dialogue program that Atkinson (1968) hopes will "provide the richest possible student-system interaction where the student is free to construct natural-language responses, ask questions in an unrestricted mode, and in general exercise almost complete control over the sequence of learning events [p. 226]."

For learning to read (and type), some children and adults have used a "talking typewriter." When the learner hits a letter on the keyboard, this machine repeats the letter aloud and simultaneously types it. By requiring the learner to type letters in a cerain order, the machine can teach him to spell certain words.

In many correspondence courses, the day-to-day plans are provided by the materials sent to the learner. He follows the sequence of reading, questions, and assignments spelled out in each lesson. Feedback usually comes by mail from a distant marker, not from the materials themselves as in most programmed instruction.

For learning a language or certain other subject matter, the person may follow a series of phonograph records or tape recordings, perhaps accompanied by a filmstrip. Language records have been common for some time, and a wide array of lectures and other spoken material is also available on records and tapes.

A more sophisticated format for language learning is the language laboratory, which is essentially a series of tape recordings, sometimes combined with printed materials. The learner may be able to repeat each word or phrase after the voice on the tape, and then replay his own pronunciation to compare it with the model.

In a few object-planned projects, two learners work together. One early form of this, described by Roalman (1963), combined programmed instruction and studying with a friend. A question-and-answer book is provided for a pair of learners. The two partners take turns reading and answering the questions, or they can work out the answers together. A more recent program, designed to improve communication between husband and wife, is called "INTIMACY: An encounter program for couples." It uses audio tapes, booklets, and other materials to help bring a husband and wife into meaningful interaction with each other.

Some effective learning projects rely on a series of television programs, videotape recordings, or motion pictures. A learner interested in a certain topic might spend

many hours watching such a series. He might watch a series of television documentaries on the future of mankind or on the various geographical regions of the world, for example. He might take a credit course in sociology or English literature through television or films.

Several decades ago, some schools experimented with learning projects in which the plans were provided by a set of printed materials. One example of these experiments was the Dalton Plan, introduced into the school system of Dalton, Massachusetts, about 1920. For a given topic, the student would receive a set of mimeographed content and instructions, including the questions and exercises for each day. Some current experiments in schools also emphasize nonhuman planners, but the planner is usually a set of programmed instruction materials or a package of audiovisual materials.

Some Characteristics of an Object as the Planner

A large investment of time and money is required to develop a good program or a new piece of hardware. This initial cost rules out nonhuman resources as planners for learning unique or rare subject matter. For financial reasons, a program will be developed only if hundreds or thousands of individuals will be learning that knowledge and skill in the near future. In recent years, however, a much greater willingness to invest in developing such programs has been evident. Important progress has been made in developing new or refined programs and hardware. New occupations in programming and designing hardware for programmed instruction have developed.

Because of the enormous amount of time and money spent on developing a program, it may be the most efficient guide in a learning project. No single person, including the learner himself, could plan a better sequence of learning activities in the particular field.

Television programs and other nonhuman resources can bring to the learner the expertise, personality, and teaching style of experts and good teachers in any field. The learner does not have to travel or spend much money for his contact with these individuals.

A series of printed materials, recordings, or television programs may provide the quickest route for gaining certain types of knowledge and skill, such as a technical skill or cognitive subject matter that is detailed (step-by-step), specific, and clearly defined. Examples are physical fitness, a foreign language, and effective reading. A nonhuman planner is also suitable for skills and bodies of knowledge that are relatively standard; that is, the knowledge and its boundaries are generally accepted, or the skill is performed in the same way by everyone. Individual opinions and styles are not important in these areas, and there may be a single sequence of learning activities that is highly efficient for most learners.

With a nonhuman planner, the decisions about what and how to learn can usually be combined (in a single resource or package) with the actual presentation of the subject matter. That is, the planner provides the subject matter as well as the plans.

Human qualities

It is obvious that there are differences between a nonhuman and a human planner. On the positive side, an object never becomes impatient with the learner. It never laughs at his mistakes or makes a scornful or damaging remark. Also, the learner who relies on a nonhuman resource for the planning is not likely to feel any obligation to it. He is not trying to please the planner, and can modify or reject its suggestions, or quit, without hurting the planner's feelings. On the negative side, an object does not provide the companionship, human interaction, and human warmth that some learners want.

Flexibility

How flexible for the learner is a nonhuman planner? Again, there is both a positive and a negative side. On the positive side, some objects leave the learner free to set his own pace, or to decide when to learn. Also, certain materials and programs are always available to the learner at any time of the day or night. The learner, therefore, does not have to fit his project into someone else's schedule or make an appointment. Some of the materials can be carried around (if purchased or borrowed) and used anywhere. Others can be kept in the home or at work, and some are available in a library carrel. The learner can listen to a television or radio series in a variety of locations, even in a hotel or cottage. In programmed instruction, branching can provide some flexibility in the sequence of learning activities; some programs even permit the learner to control the sequence.

On the negative side, an object is not as flexible as a person, even with branching and other mechanisms for handling a certain range of individual differences. Also, the learner may not want to master a complete, predetermined body of subject matter or set of skills, and he may not want to proceed in a predetermined sequence. Instead, he may be motivated by a question or by a responsibility or problem that he wants to handle successfully. Even a sequence that seems appropriate at first may turn out to be unsuitable if the person's interests shift.