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A problem of teachers, as it has always been, is to provide a learning environment with enough flexibility for each student to adjust to his individual needs. The challenge to provide this learning environment has been intensified by increasing enrollments. As a consequence of this population explosion, students may have less opportunity for individualized instruction.

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Recognizing the need for innovation in methodology, Postlethwait (1964-1965) has developed an integrated experience approach to learning called audio-tutorial. The Department of Science at the University of Northern Iowa, after investigating available data, initiated the use of an audio-tutorial method for part of its general botany course in the spring of 1966. Fifty-five students were enrolled for four semester hours of credit.

The tutorial method was designed to give students an opportunity to learn at a pace and time optimal for their individual needs. Furthermore, the activities which contribute to the learning process—repetition, concentration, immediate feedback, interaction between student and instructor, multisensory exposure to subject matter, and independent research—are combined in the audio-tutorial program. With the emphasis on individualized instruction, each student is tutored through a sequence of integrated learning activities by using audiovisual media appropriate to the nature of the subject matter. Basically these activities are programmed on audio tape. The important feature of this media is that each student has a greater opportunnity to determine his own rate of learning.

In a typical situation, students assemble for only one hour each week. The senior instructor uses this time to orientate the students to the week's subject matter and integrate it with other material in the course program. New developments in the field, application of subject matter, guest lecturers, and motivation are some of the various activities that may occur.

The tutorial learning center is open for supervised study fourteen hours per day, two days per week. It uti-

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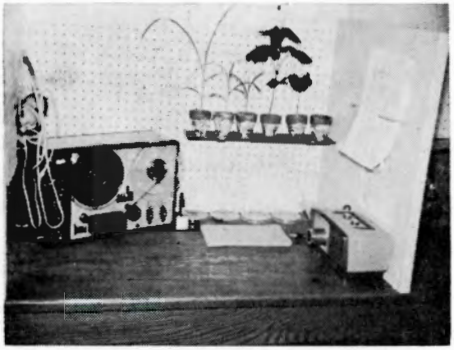

Figure 1. A carrell equipped for the learning center.

lizes, where appropriate, audio tapes, visual displays, books, periodicals, laboratory experimental set-ups, research problems, programmed materials, and manuals. Instructors are always available to assist the student. The student works in the learning center at his convenience and until he is satisfied that he has mastered the material.

The learning center consists of a number of study carrells, each accommodating one student. Each carrell is equipped with a tape player, eight millimeter movie projector, film clips, microscope, and the other materials that are required for the assignment given that week (Fig. 1). In addition, a large table is equipped with demonstration and other materials too large or expensive to include in the carrells (Fig. 2).

Figure 2. A demonstration table showing the materials for student use and study.

Learning activities are programmed in weekly units with oral quiz conferences to provide a continuing feedback to the student and on the adequacy of the teaching approach used. Each student is also evaluated on the basis of periodic written exams and independent research problems.

The audio-tutorial concept at Iowa Northern stresses supervised, self instruction. In essence, this method places the responsibility for learning and the mechanics of planning for study time on the student. It permits the instructor greater freedom to use his skills toward orientation, motivation, and guidance. An audio-tutorial system enables the instructor to provide, effectively and efficiently, those features which are found necessary to the learning process. It is now possible to conveniently program instructional material in various ways and compare their effectiveness. The apparent flexibility of this system should provide an excellent tool for experimentation in the learning process.

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