Good teaching is readily detected by students.

Good teachers on the other hand strive constantly to train themselves to recognize and practice good teaching techniques on a day-to-day basis. All proven teaching techniques should be considered and are determined by the teaching conditions at that time. New and old teaching techniques are constantly being discovered or reconstructed, and the authors would like to share their experience in teaching the basic soil science course at the University of Arizona.

A teacher is successful only if learning by the student has truly taken place. Teaching is much more than presenting knowledge. Student involvement in educational activities greatly enhances the learning process and ideally a teacher should strive to guide the student to discover knowledge, rather than telling him. This intensifies the learning process.

Frequently it is said a teacher is successful if the student has as much enthusiasm for the subject at the end of the course as the student had the first day of class. This is a good yardstick to use in measuring one's success as a teacher.

The primary goal, or objective, for the basic soils course is to stimulate learning about soil science. To do this we like to illustrate our approach with the following illustration:

*Associate Professor and Graduate Teaching Assistant Department of Soils, Water and Engineering.
The Foundation Is Knowledge

A student's ability to achieve success is based on his having adequate knowledge with which to solve his problems. His future success is also dependent upon his ability to successfully develop attitudes and skills. And we strive to help him.

Along with regular course material attitudes by way of example and method are deliberately incorporated into the course. By placing emphasis on attitudes, the instructors demonstrate their importance.

Soil science is a very important and interesting subject. The instructors must show their enthusiasm in helping students discover knowledge within the subject-matter area.

A teacher must be consciously honest, considerate, and friendly with all students at all times.

One sure way in which a teacher realizes he is being effective is when the student demonstrates he has been encouraged to develop a thirst for knowledge... a want for information.

When the teacher demonstrates happiness with the subject he is teaching and with the students he is working with, he can infectiously transmit attitude with a smile. And, usually they respond in like-kind.

The personal touch of knowing all students in your classes and also using their names appropriately and frequently further enhances their attitudinal development.

Putting emphasis on the positive aspects of classroom interrelationships while helping him through the rougher moments has a telling effect on the student's attitude.

And, when he is recognized for his achievements in developing not only knowledge, but also his attitudes and skills, he feels a sense of achievement.

Instruction Methods Used

Method of instruction used in attaining our goals is called the Auto-Tutorial approach to learning. This system was discussed in... (S. N. Postlethwait, J. Novak, and H. Murray, 1969. Audio-Tutorial Approach to Learning: Through Independent Study and Integrated Experiences. 2nd edition. Burgess Publishing Company, Minneapolis, Minn.)

Postlethwait et al refers to this as the Audio-Tutorial approach because instructions for the learning program were conveyed to students by audio tape. The word auto-tutorial is used in this paper because instructions are presented in other ways besides the audio.

Each instructor who uses the Auto-Tutorial method adapts it to his situation as we have done for our basic soils course:

Agricultural Chemistry and Soils Course 11R (Basic Soils Course) was originally taught with traditional three one-hour lectures per week. Currently the course consists of a 50-minute general assembly on Monday where the introduction and content of the week's work is discussed. A handout is distributed to each student on Monday and in this handout 10 to 20 educa...
tional objectives for the week are listed.

The general assembly is necessary to give instruction for the week, to show movies or materials unavailable in quantity and to present the professor's philosophy and feelings. Students are "conditioned" to the lecture type instruction and because of this research has shown lecture-type contacts are needed.

Preparation of education objectives are a necessity. (Robert F. Mager, 1962. Preparing Instructional Objectives. Fearon Publishers, Palo Alto, Calif., 60 p.) Listing the week's objectives forces the instructor to evaluate his course content and its importance. Also, the student will know your objectives and need not ferret-out what is important. Examination questions are written within the context of the course objectives, which helps to assure that important material is learned.

Objectives are accompanied by a "quote-of-the-week" directed toward the development of attitudes. An example is one which reads, "As a man thinketh in his heart so he is. A man is literally what he thinks, his character being the complete sum of all his thoughts."

Then handout also serves as notes and contains difficult diagrams and charts. This material supplements the textbook which is required for the course.

At the second class period for the week, students listen to the lecture on a tape recording in a learning center. This facility includes a partially enclosed booth containing a tape recorder with headphones, slide projector as well as reading material. Students have access to the learning center for many hours where they hear the tapes and study the demonstration materials. An instructor is always available for personal consultation. The instructor makes it a point to personally greet each student by name and exercise an opportunity to influence attitudes.

Since the learning center is open for many hours, the student may take whatever time he needs to understand the subject material. Usually the diff-

Figure 4. Students are encouraged to be actively involved in soil investigations to better comprehend the lesson for the week. Mike Berg, Tucson, is measuring soil pH of a sample.
Sure 5.

Ralph Ashby, lower left, Glendale, as a teaching assistant discusses plant nutrient deficiency symptoms with Don Kimble, upper left, from Douglas, and Charles Ziegler from Leesport, Pa. This is another form of actively engaging students in practical application of the lesson, and stimulating discussion between students.

Advantages Summarized

The advantage of this type of teaching utilizing the Auto-Tutorial method include:

Students prefer it over customary lecture and labs.

The approach is more individualized and uses the multi-sensory orientation.

Repetition of difficult material is possible.

The instructor becomes a personal tutor to each student when he needs it.

It is possible to have more direct association and active involvement with soil.

More opportunity exists to stimulate better attitude development.

There also are some disadvantages:

This method of teaching is extremely time consuming for the teacher if the teaching schedule is laid out properly.

Initial cost of and maintenance of equipment is greater.

This method of instruction is being continually tested and evaluated each semester. It is not the answer for all types of courses, nor is it suitable for all instructors. However, the method to date has been successful with basic soils instruction.