An Approach to Effective Teaching

The inductive approach to teaching starts the learning process with the individual and personal interests of people

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In Extension the approach taken rather than the motive of the teacher (agent, specialist, supervisor, administrator) often makes the difference between success and failure. An Extension worker may have the best of intentions, and later events may prove his concepts to be correct, but he may still fail in influencing people to change. An agent or specialist must know his subject matter, but reactions to his methods may control how much people learn.

As a rule Extension workers deal with specific situations, rather than general theories or principles, because they are interested in helping people find solutions to problems. Professional workers must know the general principles involved but people usually want solutions. General principles and theories alone are sterile and non-motivational for people who are unaware of problems: adults learn from what they do because emotions and personal backgrounds are involved in acquiring and understanding facts and concepts.

The inductive approach to teaching is not a glorification of learning specific answers as opposed to learning general principles: it starts the learning process with the interests and challenges of people and moves toward an understanding of general principles that may provide a basis for solving other problems in similar circumstances. This article is an attempt to explore such an approach to teaching-learning.

A fact is clear in a person's mind only if it is known and understood. An Extension worker's problem is to teach facts and con-

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cepts so they may become clearly organized in the mental processes of another person. This requires more than just telling. It requires a teaching approach that is learner-oriented rather than teacher-oriented or fact-oriented. This is not a revolutionary concept for Extension teachers, but it may not be well understood in operational terms. The purpose of this article is to define and develop such a student-oriented approach to teaching.

Teaching will be used to denote any type of effort to diffuse information, to encourage its adoption, or to assist people in coping with any type of problem.

Teacher will be used to denote any Extension worker—agent, specialist, supervisor, administrator—who has responsibilities include attempting to change the knowledge, skills, understanding, or behavior of others (staff members or clientele of Extension).

Student, in general, will refer to program participants, cooperators, or the “subjects” of our teaching efforts.

**Examples of Inductive and Deductive Teaching**

Examples will illustrate two approaches to teaching—inductive and deductive. In order to remain totally objective, Extension examples will not be used. However, the approaches can be easily translated into Extension terms and procedures.

A typical high school English class spends time each year reviewing grammar before themes are assigned, with special emphasis on parts of speech and kinds of sentences. When theme writing begins, subjects are often assigned by the teacher. Usually such subjects have little appeal to the student.

Contrast this approach to one used by an English teacher in Muncie, Indiana. She began her program by asking students to read short stories and essays concerning the broad question: “Am I my brother’s keeper?” Psychologically speaking, she was using, as a basis for motivation, an adolescent’s tendency to be idealistic. In class the pupils talked about what they had read, expressing their personal reactions freely. The teacher contributed to the discussions by asking questions.

As ideas developed and values were expressed the students became more interested and argumentative. All wanted to talk. Everyone had ideas. When it became obvious that there was not enough class time for everyone to say what he wanted to say, the teacher asked if they would like to write their opinions—she would read the best articles to the class. They agreed with this procedure. Most of them began writing at a fast rate.
As papers were read to the class after being graded, she pointed out such problems as run-on sentences, single subjects used with plural verbs, split infinitives, and other such errors. She suggested other possibilities for expressing the same ideas. Usually the class agreed that the teacher's sentences "sounded better" and expressed the basic concepts more clearly than the student had. After a few days of this procedure of writing-reading-criticizing, one student suggested that the class needed some help in English grammar. Other members of the class agreed almost unanimously.

Another example illustrating differences between deductive and inductive approaches to teaching is the experience of an educational consultant for General Electric Company. He was given the task of developing a course to prepare hourly rated men for jobs as foremen. He first approached the assignment by asking successful foremen what a good foreman needed to know. Their summarized opinions included: (1) A foreman must know his people and their skills; (2) he must know how to get along with all people and how to treat everyone with respect and courtesy; (3) a foreman must know the capabilities and capacities of his machines and how to adjust them; and, (4) a good foreman is a good housekeeper.

With these expert opinions as background, the consultant developed a program of ten sessions. Two sessions would stress human relations in management. One period would cover the importance of the union contract. Basic machines and their operation would be discussed in two sessions and another period would be devoted to observing their operation in the shop. Time and motion standards would be explained in another session. Cost fundamentals and shop mathematics would be given a period each. The concluding session would cover the over-all picture of company organization. These topics, the consultant felt, would provide a good basic understanding of what a foreman should know.

Then, somehow, the consultant became disturbed—both content and arrangement seemed increasingly familiar. The more he studied the proposed program the more it resembled courses he had taken and criticized as being "junk." Discouraged, he began wondering what could be done to add interest and appeal to the program.

A New Approach

The first proposal was pushed aside in favor of another approach. On the premise that "involvement of participants" is a fundamental principle of adult education, he asked each student to bring an example of all administrative forms used by foremen. The first two
periods would be work sessions to study these forms. The men would learn when to use the various forms; how to fill them out properly; what happened when the forms were turned in to management; and how the information affected operations.

In the third session the instructor planned for the students to develop some general principles of foremen's operations—combining personal experiences with what they learned in the first two periods. As a follow-up assignment, each man would ask his foreman to evaluate what the class had developed.

The consultant then asked some foremen about the toughest problem they had ever tackled. From notes made in these discussions he developed cases for study in several sessions. The ninth period was scheduled for a student summary of the significant principles learned in the case studies. Prior to the final period, each student would be asked to develop a foreman's position description as an assignment. During the session these would be read aloud, analyzed, and criticized by the group.

**ANALYSIS OF INDUCTIVE AND DEDUCTIVE TEACHING**

The four examples illustrate two methods of approaching a teaching-learning problem. In the first example of each pair the approach began with general principles and proceeded to specific or working situations. This is called the deductive approach—it is based on deductive logic as developed by Aristotle.

In the second example of each pair the approach begins with specific situations that have meaning to those involved. Conclusions or general principles were later developed from students' reactions and experiences. These examples are characterized by a large amount of student involvement and activity and illustrate inductive reasoning as suggested by John Dewey. They show the inductive approach to the teaching-learning process.

The examples of deductive teaching probably are familiar. It is a common way of organizing teaching plans for Extension meetings and other types of educational programs. We tend to develop a logical, deductive, backward intellectual movement that leads to the problems and incidents supporting our conclusions.

The examples of inductive teaching illustrate student-centered teaching. It starts the teaching-learning process with what a student (program participant) knows, his interests, his observations, and his opinions. It helps him discover relationships and important facts and principles for himself. It motivates because it stimulates curi-
osity and encourages a person to explore ideas for himself. The teacher is a source of information but not the sole source. Anyone in the group may contribute.

It seems that people would understand what is meant when a specialist or an agent tells them something. But experienced Extension workers know this does not usually happen. A teacher tends to be deductive in his methods. It is almost a natural way to teach. Why should he not tell people what he knows? It seems reasonable that they should grasp it if he tells them.

But a teacher does not typically lead a learner through the same psychological processes he experienced when he learned what he is teaching—he tends to summarize and relate general conclusions he has developed for himself. If too much summarizing is done, a student may be seriously handicapped in terms of richness of experiences. This condensing partially explains the floundering mistakes a student often makes in the learning process.

All teachers, including Extension workers, tend to teach at a level of complexity equal to their own present insight and understanding—people (even teachers!) are motivated by what interests and challenges them. The “pearls of wisdom” a teacher enjoys expounding may mean little to students. Students are characterized by being inexperienced. Persons lacking in experience may find it hard to understand general principles. People learn most completely from some form of personal experience. They learn as they organize individual perceptions into meaningful patterns of knowledge.

Early Extension workers discovered the importance of leading their students (program participants, cooperators) through the inductive approach by teaching things they needed and wanted to know. The demonstration method developed as a result. In this and in other so-called practical methods, the student is led through a series of interesting and meaningful experiences. The student discovers for himself the facts and relationships which the Extension person had established as his teaching objective.

A Psychological Basis for Inductive Teaching

In 1885 a German psychologist, Herman Ebbinghaus, published the first significant research on memory and forgetting. He showed that people remember only a small part of what they learn. His results might be partially summarized in Figure 1, curve B.

In a typical classroom situation examinations usually come, in point of time, very close to the left margin (soon after exposure).
Students are known for cramming before examinations. But in Extension, evaluation (grading) comes when knowledge is applied. This may be long after exposure. The nature of retention curves may explain why so many people do not change their ways of living or operating. It is obvious that people can not act upon information they no longer remember properly.

An object of education is to raise the level of remembered and useful knowledge, as shown by curve A. Ebbinghaus found that nonsense learning was quickly forgotten. On the other hand, he found that meaningful and organized materials were remembered for a long time (curve A). Poetry which had both meaning and an emotional appeal was almost completely remembered.

Other psychologists have studied the remembering-forgetting problem by comparing the kind of things forgotten with the kind of things remembered. In general, they have found that a fact or an experience that is remembered had a significant personal or emotional meaning to the learner at the time of learning. An experience or a fact that remains in the abstract—with no personal or emotional meaning to the learner (it may have much meaning to the teacher)—is forgotten quickly.

The inductive approach to teaching-learning is a serious attempt to apply psychological research. Inductive teaching is closely related to the concept of “creative teaching” described in educational research literature. The teacher introduces problem situations which contain concepts he wants the students to learn. As students work on the problems, guided by the teacher, they identify concepts within their experiences and thus appreciate them as being real and vital. This approach follows the principles established in motivational re-
search that declare the motives or purposes for learning must come from the learner, not the teacher.

As a general rule, Extension teachers are concerned with specific problems rather than general theories or principles. Problems call for solutions and Extension is interested in helping people find solutions to problems. Professional workers must know the general principles involved, but people usually want solutions. Extension teachers can keep motivation alive by approaching the basic principles involved after they have helped develop workable solutions to specific problems. If there is no awareness of problems, principles and theories alone are sterile and non-motivational for most people.

Inductive Teaching Fits an Adult's Needs

The inductive approach to learning is incorporated in some of the best adult teaching methods—as examples: the case method, the project method, demonstrations, and group discussions. These methods use a great amount of student involvement and activity. Adults learn from what they do because they react emotionally and acquire understanding in terms of personal background.

The inductive approach to teaching is not a glorification of learning specific answers as opposed to learning general principles. It starts the learning process with the interests of people and moves toward an understanding of general principles that may provide a basis for solving similar problems. A teacher of adults can stimulate curiosity and interest by asking questions and encouraging people to search for and develop rules and principles that seem to apply in problem situations.

Summary

People are challenged by problems that are close to their individual and personal interests. They learn from what they do, not necessarily from what they are told. Inductive teaching attempts to move from specific problems and interests of students (program participants, cooperators) to general principles that encompass a category of similar problems. Depth learning occurs when the solution of one problem leads to the recognition of others.

Extension teaching should be planned so as to achieve the best possible learning on the part of the people we serve and our professional colleagues. To do this, an Extension teacher should remember that a person remembers those facts, concepts, ideals, and skills that are meaningful to him personally.