

The Teacher And Teaching — Mechanization

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Good teaching is largely a matter of good communication! The instructor in agricultural mechanization or in agricultural engineering technology (both terms currently are being used) is indeed fortunate to have available a wider variety of instructional methods than an instructor in the social sciences.

Oral and written communications are but two of several methods which can be used to advantage by instructors in the physical sciences. This paper is an outline of some useful techniques concerning some of these methods. In this

scientific age, we must consider carefully what we teach and how much of it we can communicate in the time allotted. Information available on many subjects is increasing almost faster than we can file it, let alone read it.

Written material is but one of the many visual methods which are becoming so important in classroom instruction under the general heading of graphics. The chalkboard is still useful, but the overhead projector can do everything that the blackboard can do with the added advantage that the instructor can always face his students and remain at his desk. The important thing is to work out techniques to minimize setup time before and after class. The overhead projector is the

most expensive item, but when labor costs of mounting are considered, it may not be too much more than the cost and mounting of a good chalkboard.

The materials may seem a problem to some instructors. When written material is to be presented, roll acetate is inexpensive and easily available. Fifty-foot rolls, however, are too long to wind across the machine. Twenty-five foot rolls are more convenient since they must be cleaned off outside of class time, especially where a projector is used by more than one instructor. To write on such materials, a red or black grease pencil of the propelling type is inexpensive and is most easily erased dry.

For more permanent use, for either roll materials, or for transparencies in frames, several makes of permanent ink markers are available in various widths of line. The instructor should try each one to see which is most easily used, and also most easily erased, for he may wish to leave some information permanently on the transparency, erasable only with "ditto" fluid, and still be able to write over it with grease type pencil which can be erased dry.

A good transparency on a particular topic or subject may take hours of time to prepare, even by someone with some artistic ability, but there are several other good possibilities more readily available.

Textbooks and professional papers of the 8½ x 11 'workbook' type often contain diagrams which are large enough to make a transparency directly. Trade magazines, advertising brochures, tractor service shop manuals are other likely sources of good material. An important consideration is the amount of material, either written or drawn on the transparency. It should not be too great and should be large enough to be easily read. In the case of published or copyrighted material, permission for use should first be obtained from the author or publisher.

Still one of the best means of communication in agricultural mechanization and related materials are the large charts often seen in farm equipment dealer's showrooms and available as advertising from their sales departments. Many companies also make up large schematic educational charts to use in their training courses. All single charts should be permanently mounted on 3/16" composition board and treated¹ to resist oil and dirt, or they soon become torn and unusable.

In any learning situation involving electrical or mechanical equipment the study of actual parts is one of the best (and usually readily available) methods of communication of principles.

Junk parts can usually be had for the asking from any farm equipment service department at the dealer or branch level. The important point is to choose parts which emphasize principles rather than specifics, and on which both chart and written material is available or can be easily made up. This may involve going back to the manufacturer of the particular components. Students will remember more and remember it longer if they can handle a particular part. If they can then follow a line diagram of the flow of power, oil, electricity, etc., through the part, the principle is more likely to be retained longer. Cutaway or sectioned parts (particularly hydraulic system components) are an especially good method of following fluid flow. Housings of such parts may be cut with a hacksaw since they are usually made of cast iron. Parts for cross-sectioning must be chosen carefully, however, to show basic principles because the work is very time consuming. Relatively simple parts should be chosen at first. With the facilities of a school machine shop available more complicated parts may be sectioned. Work must be done carefully if parts are to remain moveable and held in original positions.

Another method, more useful for farm structures, electrical systems, or soil conservation, is the use of models or mockups built to scale. These require much careful thought before, and painstaking work during construction.

The college student in agricultural mechanization or in agricultural occupations not only needs to know his subject matter, but he must be able to communicate it to others, whether or not he is in a classroom situation. Agricultural occupations will involve formal classroom teaching while the agricultural mechanization graduate may easily find himself a service supervisor in charge of courses for dealer service personnel. Both need some formal training in instructional methods and materials to be able to make best use of the variety now available. In either case he needs to be able to use his hands, for he must communicate skills as well as lecture material.

A good textbook is essential for basic material, but applications, examples, and diagrams become outdated quickly. Here good use can be made of the large volume of excellent instructional and reference material available in the form of university extension or research bulletins, professional journal reprints, and manufacturers technical bulletins covering a wide variety of subject matter on electrical and hydraulic equipment, building materials and many others. The reader service cards found in many professional journals should not be overlooked as sources of much useful instructional material.

An excellent way used for many years by the author to preserve such useful material is to put it into a loose leaf binder, which can be signed out to each student for the duration of the class. This method is most practical for classes of fifty or less, or storage space and records become a problem. If the material is to be kept up to date, some work is also involved in adding new and deleting old material each year or two. Problems with some students returning the books at the end of class can be largely eliminated if loaned under a specific number and signature required. There has been no problem with senior students.

It is the firm belief of the author that if students are to be responsible for material it must be readily accessible. The above is a workable method to make it so. In addition to the more permanent material, the copy machine makes possible duplicator master copies of current material from which any number can be quickly made for class use at a cost of less than one cent per page.

To keep his material organized, the efficient teacher needs a good filing system. It need not coincide with anyone else's system since he will be the only one using it and the key will always be available to anyone else if needed. The American Society of Agricultural Engineers has a good workable system outline available as a reprint.

The communications aids briefly discussed make it easier for the instructor to get more information across to his students. It does add, however, to the work of class preparation, especially at the beginning, much of which must be done personally. To balance this there is the satisfaction of knowing that a wider variety of communication methods are demonstrated and available to those students who wish to use them during class or in future work.

1. "Charts — Preparation, Preservation, & Storage," J. J. Paterson, *Agricultural Education Magazine*, Vol. 43, No. 3, Sept. 1961, pp. 53 — 55.

POSITION WANTED

Graduate student at University of Georgia, Athens, Ga. Will complete work toward Ph.D. degree in Plant Science. Major interest is teaching Plant Genetics or Plant Breeding Course at college or university plus scientific research.