

TRANSITION IN HIGHER EDUCATION IN AGRICULTURE*

T. J. Horne

The green revolution has had a profound influence on the social and economic systems of nations around the world. Yield increases from 200 to 600 percent have been demonstrated in Pakistan and India and have triggered an agricultural revolution

*Presentation by T. J. Horne, Project Director of Agricultural Science, Southern Regional Education Board (SREB), Atlanta, Georgia, at National Association College Teachers of Agriculture, Murfreesboro, Tennessee, June 14, 1972.

of fantastic proportions. These changes have demoted some farmers from tenants to laborers as the landlords took over the more profitable farm operations. Some laborers were replaced by mechanization. The gap between the lower and upper economic classes widens. Increased production means lower prices. Nations with shortages of grains may become nations of surpluses. Changes in resource use have to be made. Displaced workers are forming dissident groups.

As you have seen in America and as you are now seeing in these nations of the world the agricultural technologist is an engineer of social change. In the past these changes created by agriculture have been allowed to run an uncharted course to their destination. This can no longer be allowed, for as agriculturists we have a responsibility for assisting in planning an orderly transition for people whose lives are disrupted by agricultural progress.

Production and People Oriented Programs

As great as the changes of the past have been we are entering a period of unprecedented agricultural transition from a production oriented agriculture to a combination production-people oriented agriculture. This change will make a deep seated, permanent impact on the face of this nation and it will have a significant effect upon every college of agriculture in America.

Even though we have won some major battles in the war on hunger, the war itself is far from over. Our researchers are winning but final victory will be difficult and will be achieved in the distant future. Ultimate victory will require continuously increasing support for research and program development over a long period of time.

While agriculture is gaining strength in production we are at the same time faced with other opportunities of increasing magnitude during this decade. Our affluent and increasingly enlightened society is imposing the mission of development of people oriented programs upon us. Today's concern is with the total economic, social and natural environment or if you prefer the setting in which people live, work and seek their recreation. The development of programs to effectively serve these needs is the challenging opportunity this transition brings you.

Agricultural Transition Brings Opportunities

Where in the past you have been primarily concerned with production agriculture you will now be concerned with the broad interests of rural and urban America. The needs of these groups are more easily determined today because we are becoming more sophisticated in our collection and use of knowledge in program planning.

Some of these opportunities which will have major impacts on your programs are in the areas of: constraints on natural resources likely to be imposed on producers and users of land and water; achievement of a balanced growth which allows rural America to share meaningfully in the nation's economic expansion; development of a healthful environment in which people can live, work and play; new systems of crop and livestock production with emphasis on biological insect, disease and weed control, as an example: a closer coordination between colleges of agriculture and off-farm businesses and industries in conducting programs of pre-service and continuing education for careers in agriculture; new and innovative marketing systems for agricultural products; expanded credit programs for agriculture; plant and animal nutrition and health protection; agriculture's role in urban planning and development; coordination and cooperation of colleges of agriculture, for example, development of regional programs; interpreting the significance of agriculture's mission to the total public.

These and other problems which present us with our opportunities will call on our best brains and manpower to develop solutions. As you can see, these concerns relate to attitudes of urban and rural people, to research and technological approaches that need to be pushed now to solve tomorrow's needs, and to programs development which needs to be inaugurated now to supply educated manpower for leadership roles in the newly developing agriculture.

Students currently enrolled in your colleges of agriculture will be our agricultural leaders of the 1980's. Give them experiences in relevant programs involved in the emerging opportunities created by the current transition to people oriented programs in agriculture. Such programs will call for all the abilities, constructive imagination and energy that we can muster and the effective involvement of our students in experiential learning will be vital.

Transition Requires New Programs of Education

As we examine the opportunities which transition brings we can only imagine what wonders may lie ahead for agriculture. The current rate of change in agricultural science has become so explosive that changes can occur much earlier than expected. In this light then, we must move now in developing entirely new programs of education in agriculture. To achieve a desirable degree of success we will need to take a "systems approach" to their development. Narrowly specialized degrees and those curricula pulling together isolated bits and pieces of technical data, as provided in too many departmental programs of study at the undergraduate level, will not suffice for educating leaders to serve the agricultural needs of the people in the future. Effective programs will require a combined team effort of many interrelated disciplines. Transition is now providing us with a major opportunity to develop programs of instruction capitalizing on the effective use of educational technology applied to the student's capacities during the learning process.

The recent coordinated and cooperative efforts of the land-grant colleges of the 14 Southern states to effectively develop foundation courses in agricultural sciences for all students in agriculture, regardless of their areas of specialization, serves as an example of the team approach required in the development of program requirements brought about by the transition to people oriented programs in agricultural sciences.

The Need for Foundation Courses

During the mid '60's the deans and directors of resident instruction of the land grant colleges of agriculture of the Southern region, realizing that colleges of agriculture were approaching a period of transition, reached the decision that one of their most pressing needs would be the development of courses in the areas essential to an effective education in agriculture. They agreed that foundation courses in the areas of animal science, plant science, socio-economic science and agricultural mechanization, all incorporating the essential principles and application of other sciences, would provide a good beginning in agriculture for any student regardless of his area of specialization or his career orientation.

As the volume of research data multiplies and careers in agriculture become more people oriented the offering of introductory courses in each subject-matter area is no longer possible in the curricula of our colleges of agriculture. The expansion of agriculture in our Junior College system focused attention on the need for foundation courses which would more adequately prepare students for transfer to the upper division levels in our senior colleges and universities. Few of our universities have the expertise, resources and financial support necessary to develop the kind of courses and teaching-learning materials needed for efficient instruction in such courses. Even though it is generally recognized that instruction in agriculture is as good or better than in any similar division of the University system we are constantly striving to improve our teaching-learning. While agriculture provides an excellent opportunity for the use of audio, visual, other sensory and live materials, it is apparent that many educational media and technologies are not being used effectively in teaching agricultural science courses. For these and other reasons the development of Foundation Courses in Agricultural Sciences were undertaken.

Early Efforts of the Regional Committee

A committee consisting of Neal Peacock, Randall Jones, Robert Wheeler and Stanley Wall was appointed to develop a proposal to obtain funds to support the development of these courses. After several disappointing attempts to obtain funds for the project the committee turned to SREB for assistance in developing the courses.

In 1969 Robert Wheeler met with the SREB Council of Higher Education in the Agricultural Sciences to explain the project and ask their support in carrying it out. At that time they endorsed the project and agreed that SREB should assist with its implementation as it fitted into the program of agricultural sciences of the land grant college project of the region supported by

the W. K. Kellogg Foundation. Progress has been slow because we had to develop the procedure for such an effort and launching a project conservatively estimated to cost over a million dollars with no staff and no specific budget is to say the least a little difficult.

General Situation Concerning College Teaching

Early in 1969 a review of the situation in the region indicated that traditional college teaching, placing the primary responsibility for learning upon the student, had been in vogue in the region because of a number of reasons – some of the primary ones were:

1. College teachers lacked an understanding of learning theory. Faculties were drawn from research oriented rather than teacher oriented programs, therefore, they had little understanding of learning theory, teaching methodology or technology of instruction.
2. Graduates tended to emulate their teachers. Because they came through research oriented environments in which teaching was frequently considered an extra burden they had a limited perception of their role as college teachers. They considered themselves primarily as dispensers of knowledge. This served as a basis for the philosophy which placed the responsibility for learning on the student.
3. Colleges provided little education for prospective faculty members in providing them with learning experiences designed to maximize learning in individual students with different abilities and aptitudes. Colleges vocalized a concern but practices were concentrated on educating masses of students with emphasis on process rather than the product.
4. Teachers used the normal curve as the basis for awarding students final grades. This process pitted student against student rather than measuring their progress towards achieving their defined educational objectives in their courses of study.

As a result of these and other factors existing in the region we concluded that opportunities to enhance learning and education of college students have been neglected because administrators and their faculties have not made the real organized effort needed to provide the "software" required in providing effective programs of education in our colleges.

A Systems Approach to Learning

After working with the project for a short period of time we decided that the foundation courses should contribute to speeding agricultural transition and make a meaningful impact on effective education in agriculture in the region. To do this we decided to change the program of instruction and educate teachers to use the new technologies and developed material effectively.

Today's educational technology indicates that programs designed to increase instructional effectiveness are built around a systems approach to decision making. To me, an "Instructional System" is a comprehensive set of learning media (including objectives, subject matter content, curriculum materials, methods and strategies of instruction, learning aids and devices, and student selection and evaluation processes), facilities and equipment, and instruction personnel integrated into a systematically organized teaching-learning process. Such a systems approach has the potential of permitting and facilitating management of the total learning environment.

Implementation of this concept requires the teacher to make the transition from lecturer or dispenser of information to a new role of director of learning. Filling the role of director of learning requires the faculty member to:

1. Write out instructional objectives in behavioral (measurable) terms.
2. Pre-determine learner capabilities in the subject content.
3. Identify and clearly define the techniques to be used to advance the learner from his current level of capability to the desired terminal behavior (performance) level.
4. Prepare relevant measures for post evaluation.

Each of these steps in a systems approach to instruction is

equally important and essential in placing the teacher in a role of accountability. If the teacher is to be held accountable for the failures as well as the success of his students, these steps must become part of the system of instruction. Such a process moves the teacher into the role of manager of the total learning situation and out of the minimum role of information dispenser. Placing the responsibility for causing learning on the teacher retains the student as an active participant in learning. It requires the teacher to consider and plan for variables in the learning process (individual differences in aptitude, ability, performance levels, and motivation of students). It is through such individualization built around clearly defined behavioral objectives supported by valid approaches to measurement of individual student progress that the concept of accountability becomes meaningful.

Procedures Followed in a Regional Approach to the Development of Foundation Courses

In accordance with these concepts of a systems approach to teaching-learning we proceeded to implement their application in the development of foundation courses in the agricultural sciences as follows:

1. Worked with the committee of deans and decided to use a task force team of specialists in discipline areas to develop each course.
2. Requested deans of the land-grant colleges in the region to nominate members for the task forces whom they were willing to release from their regular college assignments for the time required to develop the course content.
3. Task force teams were selected by SREB from the nominees submitted. Each member was notified of his selection and asked to prepare an outline of the content for the course, using the personnel and resources available at this college.
4. Called the task force team together to consolidate ideas and develop preliminary course outline. Designated a task force team chairman and each member forwarded revisions of the outline to the chairman for consolidation and distribution to the team members.
5. Each task force team member selected sections of the course content for which he would develop the teaching-learning materials. Each member was then asked to select a unit of material that he would normally cover in a one to two hour lecture and prepare all the materials he would need in teaching this unit using his conventional means of teaching. In addition they were asked to study references on preparing instructional objectives.
6. The task force team was then brought together to work with consultants for a three day workshop. They each brought all the material they had developed on the one unit and with each task force member using their own materials in the workshop were led through the steps in developing an individualized teaching-learning packet. This gave them the procedure, techniques, and confidence required to continue developing packets of materials.
7. During the summer the task force teams were called together for a two week period to review their work to date, coordinate efforts and continue the development of packets. A consultant and a dean designated as task force advisor meets with the task force as needed during the work period. Each member of the team is provided with copies of all packets of materials developed for the course.
8. The task force team members reproduce and try out the packets with their classes during the academic year. They gather student reactions, performance data and suggested revisions for each packet of material. They continuously revise, improve and update the material.
9. During the summer following the try-outs the task

force team is brought together again to revise and update the packets on the basis of their combined experiences and student inputs.

10. Following this revision we make the courses available to other land grant colleges who want to use them in their classes. Before these faculty members are given the materials they are required to go through a three day workshop following the step-by-step procedure in developing a packet and using it in teaching-learning. In following this procedure each user becomes an involved participant in the further development and improvement of the course materials.
11. This year we are inaugurating the finishing step in the development process. Each participating faculty member is being asked to select one or two packets of material for further development during the year. He will concentrate on these packets to develop the best teaching materials he is capable of devising to assist students in effectively achieving the performance standards set in the objectives for the packet. By concentrating on one or two packets and using the resources of his university in preparing the best materials they are capable of developing and forwarding these to a regional center for reproduction and distribution we can have the best teaching-learning materials ever developed for a single course. This procedure imposes no burden on any one faculty member or university in developing materials, yet makes the best of all of them available to teachers and students in the region. This process can have a tremendous effect upon the program of instruction in the colleges of agriculture and can influence the university's approach to learning as we involve faculty members in the systems approach. College of agriculture faculty members are suddenly finding themselves in positions of leadership in their universities as they move to a systems approach in learning.

The Project Director's Role

Our office serves as catalyst in the development of these courses. We have provided leadership, coordination and modest financial support for the development, revision, duplication and distribution of materials. Someone has to be in a position to devote time and effort to initiating and following up such coordinated team efforts. Such a person needs to be in a position to obtain administrative support from the participating colleges, make decisions and provide modest support for the task force teams.

In Summary

Agriculture is in a major transition in which changes will develop rapidly. Use of a systems approach in planning for many of the opportunities which the transition will bring will be essential. Such a system applied to teaching-learning can use all known educational technologies in capitalizing on the use of the 5 senses (seeing, feeling, tasting, smelling and hearing) of students in learning. It is limited only by the imagination, initiative and resources of the participants. Students can and do contribute to developing and improving learning materials. We are finding that use of the individualized systems approach allows the teacher time to do what he can do best in helping students learn, namely:

1. Diagnose learning difficulties.
2. Interact with students on 1-1 basis or in small groups.
3. Inspire and motivate.
4. Identify and encourage creativity and self-direction.

A systems approach to teaching-learning is quite a departure from the procedure of hiring a faculty member in late summer and telling him that he will teach the course in the fall term and will have to develop the content and carry on the other duties of his job simultaneously.

The example I have given you represents a type and scope of the kinds and magnitude of transitions that you can expect to make during the '70's if you are to effectively prepare students for careers that are being created by the production-people-oriented programs in agriculture.

Transition in Higher Education in Agriculture will occur at an increasingly rapid tempo. Many of the careers of today will not be available in the '80's, therefore, the speed with which you make transitions will determine in large measure those programs which will be effectively educating agriculturists for the next decade.

The opportunities provided by transition to people oriented programs in agriculture are so great that they will require cooperation of institutions, private organizations, businesses and industries, governmental agencies at all levels, rural and urban peoples.

As we begin to make changes towards a people oriented agriculture it is obvious that we need imaginative and creative people. Agriculture will need the best people it can get in rural development, off-farm segments, governmental organizations and agencies, institutions, urban planning and development, consumer interest related to food and fiber and environmental quality. Colleges of agriculture are the chief sources of supply.

There is little doubt that this decade will be full of excitement. We are committed to service a great American public. As Earl L. Butz, Secretary of Agriculture, recently said in a meeting in Atlanta, "Our greatest challenge — our greatest need — our greatest opportunity of all — will be to develop people who can carry forward the mission of agriculture and rural America triumphantly."