

K. C. DEVARAJ URS

TEACHING-LEARNING Symposium



Kansas State University
Manhattan Sept. 5-7, 1967

The College of Agriculture is grateful to Extension Director Harold E. Jones and the Cooperative Extension Printing Service for making distribution of this publication possible.



K. C. Devarajulu

KANSAS STATE UNIVERSITY *Manhattan, Kansas 66502*

VICE-PRESIDENT FOR AGRICULTURE, WATERS HALL 114

DEAN, COLLEGE OF AGRICULTURE, WATERS HALL 117
DIRECTOR, AGRICULTURAL EXPERIMENT STATION, WATERS HALL 113
DIRECTOR, INTERNATIONAL AGRICULTURAL PROGRAMS, WATERS HALL 14
DIRECTOR, KANSAS EXTENSION SERVICE, UMBERGER HALL 122

November 17, 1967

Faculty
College of Agriculture

Dear Colleagues:

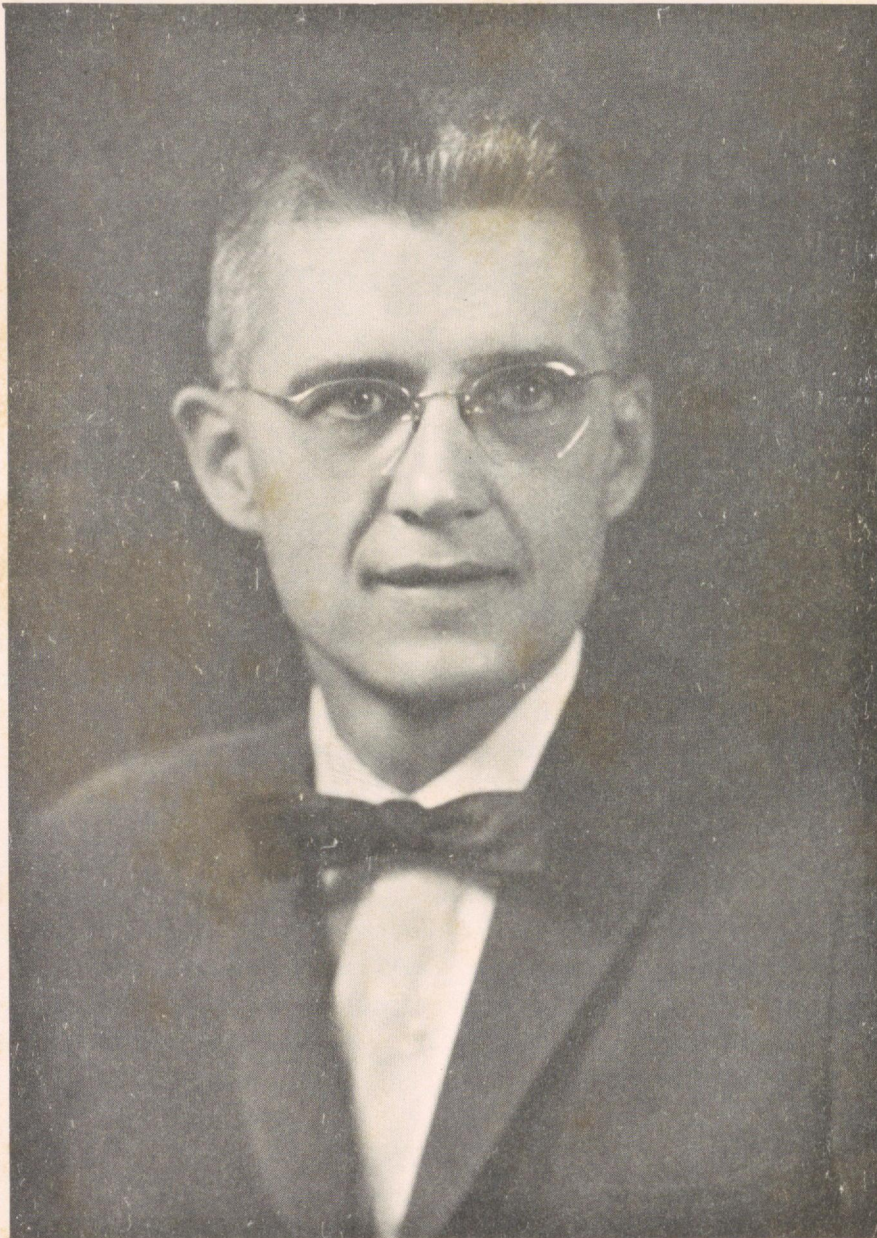
It has been said that Land-Grant Universities have become more interested in graduate study and research than in the undergraduate teaching function. The Symposium on Instruction held September 5-7, 1967, at Rock Springs Ranch belies this accusation for Kansas State agricultural faculty. This clearly reflects a sincere interest among our faculty in improving their teaching capability.

My compliments to the Committee on Effective Teaching, chaired by Arlin Ward, and to Dean Carroll V. Hess for their initiative in promoting and sponsoring this fine symposium. I commend all of you who participated in this event, which I know will be fruitful in terms of increased interest in and effectiveness of our undergraduate teaching programs. I hope this will provide the impetus for additional seminars on improved teaching.

Sincerely yours,

Glenn H. Beck
Vice-president for Agriculture

GHB:hj



Dr. Kenneth Burkhard, Department of Biochemistry, College of Agriculture, was recipient of the first Gamma Sigma Delta Outstanding Teacher Award. Dr. Burkhard is pictured on the cover during a typical classroom session.

NEW INSIGHTS INTO YOUR PERFORMANCE AS A TEACHER

Symposium on Instruction

Rock Springs Ranch
Junction City, Kansas

September 5, 6 and 7, 1967

Published by
College of Agriculture
and
Cooperative Extension Service
Kansas State University
Manhattan, Kansas

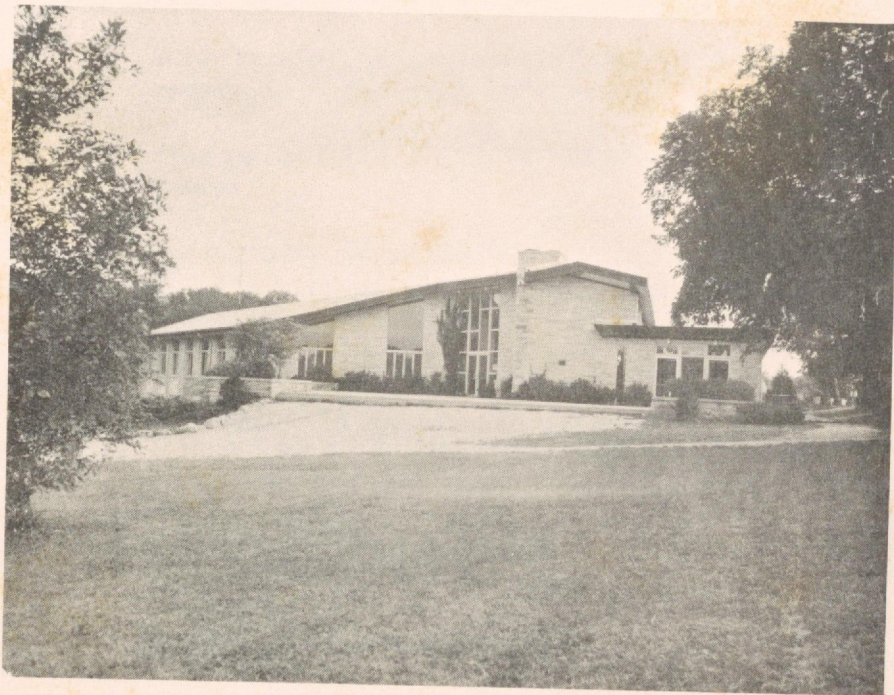
The Symposium Staff

Dr. David G. Danskin is professor of psychology and director of the Counseling Center at Kansas State University. He has had a continuing interest in the agriculture student and has assisted the College of Agriculture in understanding its students, improving its advisory program, and designing its programs of study.

Dr. Carroll V. Hess has been dean of the College of Agriculture, Kansas State University, since April 1, 1966. He came to Kansas State from the University of Minnesota where he had been professor of agricultural economics. He has also served on the faculty of Southern Illinois University, Pennsylvania State University, and was a researcher with the Economics Research Service, U.S.D.A., with headquarters at Cornell University. His great interest has been undergraduate instruction and he provided much of the initiative in the American Farm Economics Association's recent interest in improving undergraduate instruction in agricultural economics. He was the first recipient of the Distinguished Undergraduate Teacher Award by the American Farm Economics Association in 1965.

Dr. R. Stewart Jones received his university degrees from the University of Omaha and Ohio State University. He is professor and head of the Department of Educational Psychology at the University of Illinois. He is active in several professional educators' associations and has been actively concerned with improving the quality of university instruction. Besides teaching he has authored or served as editor of a number of publications, including three books.

Dr. Richard E. Owens is assistant professor of education at Kansas State University. His education was received at Northwest Missouri State College and Colorado State University. He has spent 10 years as a teacher, counselor, and director of guidance and testing in the Missouri, Iowa and Colorado public schools. At Kansas State he is particularly interested in educational psychology and guidance.



Headquarters for the Symposium at Rock Springs Ranch



Participants in the Symposium

Program and Contents

<u>Tuesday, September 5</u>		<u>Page</u>
3:30-5:30 p.m.	Registration - Lobby, Williams Dining Hall	
6:00 p.m.	Dinner - Williams Dining Hall	
	Arlin Ward, Department of Grain Science, presiding	
	"Rock Springs Ranch: History and Facilities" - Merle Eyestone, Director, Rock Springs Ranch	
7:30 p.m.	Getting Acquainted - Basement Auditorium	
	"The Purpose of the Symposium" - John Sjo, Department of Agricultural Economics	1
	"What's New in Teaching in Your Department"	5
	Agronomy and Horticulture-.....Kurt Feltner	5
	Forestry.....Charles Hall	
	Agricultural Economics.....Milton Manuel	5
	Agricultural Education.....Raymond Agan	7
	Agricultural Journalism....Delbert Brinkman	8
	Agricultural Mechanization.....Ralph Lipper	11
	Animal Husbandry.....Calvin Drake	12
	Biochemistry.....Kenneth Burkhard	13
	Dairy-Poultry Science.....J. David Mitchell	14
	Entomology.....Robert Mills	15
	Extension Education.....Robert Johnson	17
	Grain Science & Industry.....Eugene Farrell	18
	International Agricultural Programs.....Warren L. Prawl	19
	Plant Pathology.....Joseph Dickerson	21
	Refreshments - Lobby, Williams Dining Hall	
 <u>Wednesday, September 6</u>		
7:30 a.m.	Breakfast - Williams Dining Hall	

Wednesday, September 6 (con'd)

Page

8:30 a.m.	Carl Menzies, Department of Animal Husbandry, presiding - Basement Auditorium	
	"The Ag Student" - David Danskin, Counseling Center	23
9:00 a.m.	"Principles Undergirding the Teaching-Learning Process" - R. Stewart Jones, Department of Educational Psychology, University of Illinois	37
10:20 a.m.	Coffee - Lobby, Williams Dining Hall	
11:00 a.m.	Discussion with Resource Persons - R. Stewart Jones and Richard Owens, College of Education	42
	Recorder - William Carpenter, Department of Horticulture-Forestry	
12:00 noon	Lunch - Williams Dining Hall	
1:30 p.m.	Ernest Mader, Department of Agronomy, presiding - Basement Auditorium	
	"Teaching Objectives" - Richard Owens	45
3:00 p.m.	Coffee - Lobby, Williams Dining Hall	
3:20 p.m.	Discussion with Resource Persons - R. Stewart Jones and Richard Owens	53
	Recorder - William Carpenter	
4:30 p.m.	Recreation - Robert Mills, Department of Entomology, in charge	
	1. Horseback Riding	4. Softball
	2. Swimming	5. Archery
	3. Rifle Range	6. Loafing
6:00 p.m.	Outdoor Barbecue - Picnic Area	
7:30 p.m.	Evening Discussion Groups	55
	Wilbur Ringler, Extension, presiding	
	The following topics are suggested for discussion by each group:	

Wednesday, September 6 (con'd)

Page

	Examinations	Classroom Facilities	
	Advising	Honors Program	
	Class Size	Graduate Student Problems	
	Pass-Fail	Follow-Up (Action)	
Group I:	Basement Auditorium		55
	Leader -- Keith Huston, Dairy-Poultry		
	Recorder -- Howard Bradley, Education		
Group II:	Conference Auditorium		56
	Leader -- Walter Smith, Animal Husbandry		
	Recorder -- Hugh Thompson, Entomology		
Group III:	Small Dining Room		58
	Leader -- Elmer Heyne, Agronomy		
	Recorder - Ben Brent, Animal Husbandry		
Group IV:	Lobby, Williams Dining Hall		59
	Leader -- John McCoy, Ag. Economics		
	Recorder -- David Mugler, Dairy-Poultry		
Group V:	Chapel		60
	Leader -- Hyde Jacobs, Agronomy		
	Recorder - Warren Prawl, Extension		
Group VI:	Dining Room Williams Dining Hall		63
	Leader -- Earl Hansing, Plant Pathology		
	Recorder -- Harold Tuma, Animal Husbandry		
9:00 p.m.	Refreshments - Lobby, Williams Dining Hall		
	Reports from Discussion Groups - Basement Auditorium		
	Recorder - William Carpenter		

Thursday, September 7

7:30 a.m.	Breakfast - Williams Dining Hall	
8:30 a.m.	Kurt Feltner, Department of Agronomy, presiding - Basement Auditorium	
	"Teacher in Action" - Richard Owens	65
10:00 a.m.	Coffee & Punch - Lobby, Williams Dining Hall	

Thursday, September 7 (con'd)

Page

10:20 a.m.	Discussion with Resource Persons - R. Stewart Jones and Richard Owens	73
	Recorder - William Carpenter	
12:00 noon	Lunch - Williams Dining Hall	
	Arlin Ward, presiding	
	Comments - James P. McComas, Dean of the College of Education	
1:30 p.m.	Arlin Ward, presiding - Basement Auditorium	
	"Innovations in the Classroom" - R. Stewart Jones	75
2:30 p.m.	Discussion with Resource Persons - R. Stewart Jones and Richard Owens	78
	Recorder - William Carpenter	
3:00 p.m.	"An Administrator Looks at Teaching" - Carroll V. Hess, Dean of the College of Agriculture	81
3:30 p.m.	Adjournment	
	Conference Participants	92

Symposium Committees

General Planning

The Committee on Effective Teaching in the College of Agriculture

Arlin B. Ward, Grain Science & Industry.....Chairman
Calvin L. Drake, Animal Husbandry
Ernest E. Mader, Agronomy
Wilbur E. Ringler, Extension
John B. Sjo, Agricultural Economics

Charles Peccolo, Education.....Consultant
Henry Wright, Architecture.....Consultant

Program

John B. Sjo, Agricultural Economics, Chairman
William J. Carpenter, Horticulture-Forestry, Recorder
Kurt C. Feltner, Agronomy
Carl S. Menzies, Animal Husbandry
Wilbur E. Ringler, Extension

Arrangements

Ernest E. Mader, Agronomy, Chairman
Calvin L. Drake, Animal Husbandry
Hyde S. Jacobs, Agronomy
Donald H. Kropf, Animal Husbandry
Robert B. Mills, Entomology

Proceedings Publication

William J. Carpenter, Horticulture-Forestry, Editor
Ray A. Keen, Horticulture-Forestry (Photographs)

OBJECTIVES OF THE TEACHING---LEARNING SYMPOSIUM

John Sjo
Agricultural Economics
Kansas State University

On behalf of the College of Agriculture Committee on Effective Instruction, I wish you welcome to this Teaching---Learning Symposium. It is the most concentrated effort to emphasize improving undergraduate instruction that has ever been made by any college at Kansas State University. I am proud that our college is taking the leadership. Today's and tomorrow's university student will demand quality instruction and he'll know when he's not getting it. As necessary as a high level of technical competence in subject matter is, it will not be sufficient for the coming generations of students. They will expect -- they have a right to expect -- teachers not obsolete in teaching methodology. It is absolutely necessary that Kansas State University guard against obsolescence. The Committee on Effective Instruction hopes this Teaching---Learning Symposium will be the first of a series of activities to emphasize the need for the most advanced teaching techniques and how to use them.

The objective that guided the committee in the development of the program can be stated as follows:

1. To help the participants develop new insights into their performance as teachers;
2. To emphasize the importance to the participants of improving the effectiveness of their instruction.

A university has these important functions to perform: to serve as a guardian of man's wealth of knowledge, to add to that wealth by the discovery and creation of new knowledge, and to provide a means to transfer accumulated knowledge to the succeeding generation.

Unless the universities are effective in the last of these functions, there is little reason to labor to achieve the first two. The effective transmittal of our accumulated wealth of knowledge in a steady and ever increasing flow from one generation to the upcoming generation and to insure deeper understanding of truth are the real missions of a university. While at this symposium, our intent is to draw your attention to those functions. Although we shall emphasize the transfer of knowledge, let us not forget effective instruction can rest only on vigorous achievement of the first two -- the guardianship of knowledge and adding to our inherited store of knowledge. All three are so interdependent that neglect of any one may cause the others to wither away.

In recent years there has been a general feeling, which I feel can be substantiated by empirical evidence, that the faculties of the universities of our land have been so completely influenced by the desire to excel in acquiring new knowledge through research activities that the faculties' will to excel in classroom instruction has been nearly snuffed out. One of the reported complaints of the Berkeley students was dissatisfaction with heavy emphasis on research and lack of faculty concern for knowledge transfer.

Underlying the development of effective teaching are these needs:

1. An understanding of the nature of man and how he communicates with other men in order that we, as teachers, comprehend how knowledge is individually acquired and information is exchanged.
2. An awareness of the mechanical and electronic technological innovations that can be used in the teaching-learning process.
3. A concentration of effort in fully developing individual teaching capabilities.
4. A high level of subject matter proficiency.

In agricultural faculties, no one, unless he at some time planned a career in elementary or secondary education, has had more than the scantiest introduction to the principles of learning and communications, to using audio-visually, or to developing teaching skills. (points 1, 2 and 3 above) Further, I contend that we have accepted the assumption that a high level of excellence in a subject matter (point 4) makes unnecessary serious consideration of 1, 2 and 3 for effective teaching. Subject matter competence, it is argued, is so basic to effective instruction that it can substitute for training in the principles and methods underlying the teaching-learning process.

At this symposium I propose we take as our basic premise that the faculty is technically proficient in subject matter. Further, that the greatest improvement in teaching can come by concentrated effort on understanding the principles of learning, developing an awareness of the technology that can be applied to teaching-learning, and treating teaching as a skill that can be improved by training and practice.

As in other artistic endeavors, in teaching there seems to be no operational procedure or technique that assures individual effectiveness or success. Using and adapting techniques must be an individual matter. Each must find the techniques that best suit his unique personality characteristics and capabilities. Therefore, no single symposium such as this can lay out a recipe for effective instruction. It can serve only as a stimulus for each of us to explore techniques suited to our use.

Some teachers may be great and creative without understanding teaching-learning principles, techniques, and technologies. Even the great teachers may increase their effectiveness by concentrated effort in further developing their skills. Many of us who have very ordinary creative skills as teachers can greatly improve our craftsmanship through concerted effort and training and become more effective teachers.

Therefore, the Committee on Effective Instruction felt the College of Agriculture needed to embark on a program of reaffirming the importance of classroom instruction, particularly at the undergraduate level. The Committee has been actively working on three ideas:

1. Improving physical classroom facilities.
2. Exploring how to bring before the faculty the urgency for improving classroom instruction.
3. Exploring how the principles underlying knowledge acquisition can be brought before the faculty.

The last two are being implemented by the committee through a series of winter seminars to be announced later and by this two-day symposium. We hope that each of you will throughout the symposium make mental notes of ideas for the committee to further implement those three objectives.

Tonight the Committee on Effective Instruction is pleased to open the Teaching---Learning Symposium that it has been planning and developing throughout the summer. It is our hope that the symposium will enliven the faculty's desire for more effective instruction and will provide the opportunity for two days of concentrated and uninterrupted serious intellectual inquiry into how we, each of us, can become more effective teachers.

The program has been developed to emphasize:

1. Understanding learning principles
2. Understanding the students we get -- essentially Kansas farm boys
3. Understanding teaching methods

The committee, with the sympathetic and generous support of Vice President Beck and Dean Hess, consisting of Arlin Ward, Chairman, Calvin Drake, Ernest Mader, Wilbur Ringler, John Sjo, and supported by special committees and consultants, has developed a symposium program it believes will achieve its objectives if each of you freely and enthusiastically participate in the program. The Committee on Effective Instruction challenges each of you to contribute to making this symposium a catalytic spark to fire us to more effective instruction.

WHAT'S NEW IN TEACHING

Plant Sciences

The course, Principles of Plant Science, has been taught jointly by Agronomy and Horticulture for 6 years. The course develops the basic botanical principles of classification, growth, development, and ecological relations as they apply to agronomic and horticultural plants. A grant from the National Science Foundation made available equipment for the laboratory, which included photographic equipment for production of a series of films to be used in teaching the course. A series of these short time-lapse films, which illustrate plant growth and response to certain factors, were shown. Films are to be printed on super 8 mm and made into single concept film loops. Equipment for using the film loops were demonstrated.

Reported by: Kurt Feltner, Agronomy
Charles Hall, Horti-
culture - Forestry

Agricultural Economics

I wish to develop my comments around three main points. First, what's new in courses and departmental procedures on instruction. Second, what's new in teaching methods and teaching techniques. And, third, a statement on the need for additional teaching support for instruction in our department. Some of my remarks will deal with aspects of our teaching that we feel are working especially well and would like to share with others. In addition, I would like to set forth some of the problems we face in carrying out the kind of instructional program that we feel is needed. Because of limited time, it will be possible only to enumerate items with very little, if any, elaboration.

What's New in Courses and Departmental Procedures on Instruction

One recent course change bears mentioning. A change was approved last spring in our "Principles of Agricultural Economics." The new version of this course is being offered this fall for the first time. Credit hours are being changed from four to three. But more important are changes in the scope of the course and the level at which it will be taught.

We have noted that many agricultural students find Economics I somewhat abstract and lacking in meaning. Even though it will not replace Economics I, the new course is designed to introduce students to

some economic concepts and to start their development in this area. But more important, it will show students aspects of economic problems that many of them will have experienced and will demonstrate how economics might help solve some of those problems. The course will deal with economic problems, not only of farm firms but also of marketing firms as well as those of agencies.

We have been making some changes that I feel are working well in advising and related activities of working with students. One case in point is the matter of adviser meetings. Occasionally, our student advisers meet informally to exchange ideas and to discuss mutual problems. That has helped us do a uniformly better job in dealing with students. Under the leadership of Dr. John Sjo, we have developed a summary of requirements for students. Our summary lists college requirements. In addition, it states departmental policies on matters of programs and curricula. Another new aspect of our departmental teaching procedures is that we have developed our own curriculum guide. That was done by working with the Dean's office so it will be an official program of study. Such guides save time of advisers and give students a better understanding of the curriculum for our majors. Also, we are in the process of preparing a handbook of departmental courses. The handbook devotes one page to each course, setting forth the following: (1) scope and objective, (2) course description, (3) topical outline, (4) teaching methods, and (5) major source materials. We think the handbook will help students and faculty alike to be better informed on courses in our teaching program.

Teaching Methods and Techniques

A chief concern in teaching agricultural economics is the matter of applying economic principles to agriculture. Here, I am using agriculture in the broad sense to include nonfarm firms that are related closely to farming as well as agricultural agencies. Of course, one phase is to help students understand the economic principles involved and then to show how the principles are being applied or how they might be applied in making decisions.

The challenge is to secure and develop appropriate teaching materials to demonstrate the application of economic principles to current problems. Visual aids can be useful in this regard. We now have some fine 3M overhead projectors, which are well adapted for presenting charts, graphs, tabular material, models, etc. But the instructor faces many problems in trying to adapt his material to such use. Some problems we face are: (1) confusion with 110 and 220 volt circuits, (2) size and arrangement of class rooms, (3) securing use of equipment that will make satisfactory transparencies, (4) having the time and funds to prepare materials, and (5) appropriate lighting. We need to find solutions to those problems if we are to effectively use overhead projectors and related teaching aids.

The Need for Additional Support for Teaching

Our teaching load has been increasing sharply. The number of students majoring in agricultural economics has been increasing steadily. Also, we are experiencing very rapid increases in class enrollment in courses such as grain marketing and livestock marketing, which are made up primarily of nonmajors.

Increased numbers of students are forcing us to use the lecture technique more than class discussions. Often the nature of class materials is such that opinions and value judgments need to be considered. In such cases, the lecture technique is not the most desirable.

A recent examination of our departmental teaching program revealed that we currently are devoting considerably more staff time to teaching than is budgeted. The matter is particularly crucial at the undergraduate level. Several new graduate courses have been introduced to handle our expanding graduate program. Therefore, we are attempting to carry an increasing undergraduate program with a declining number of budgeted tenths of teaching time. I appreciate that budgeted teaching time is very limited, but the present trend in our department is not compatible with high quality instruction and advising.

Reported by: Milton Manuel

Agricultural Education

- I. Using educational television for student teaching
 - A. Pre-student teaching
 1. Student views and critiques last year's student teachers
 2. Student teacher hears University supervisor's critiques
 3. Student teacher observes "good" and "bad" teaching situations
 - B. During student teaching
 1. Saves time of University professional staff
 - Telephone is used to instruct student teacher after University staff views the television tapes
 - System lacks desired personal touch, does not entirely eliminate need for personal visits
 2. Student teacher can see himself
 - Can detect speech mannerisms, "ok" "jist"
 - Can see student reaction to teaching
 - Can see chalk board technique
 3. Post analysis of student teaching
 - Can study student teaching experience after his return to campus

- II. Using educational television for other uses
- A. Preserve field trips for other classes
 - B. Training procedures -- how to do it the right way
 - C. Micro-teaching
 - D. Measuring growth through pre- and post-recording

Reported by: Raymond Agan

Agricultural Journalism

As one editor of a national farm magazine put it, opportunity is knocking the door down for agricultural journalists. In fact, records show it's knocking to the tune of six job openings for every college graduate in the agricultural communications field.

The trend toward a faster moving, more complex agriculture with fewer but more efficient farmers is bringing new demands for agricultural communicators:

1. Farm publications and broadcasting stations are seeking farm editors whose training is geared to streamlined agriculture. They need people who have more than just a kit of journalistic skills.
2. New farm publications of specialized types are entering the picture, such publications as Feedlot, Beef, Hog Farm Management and Big Farmer. They require editors who are at home in a given subject matter area and at the same time are skilled in communication methods.
3. Demand is growing for qualified young men and women in agricultural advertising. Business firms that provide farmers with specialized products and services are seeking people who have unique skills and knowledge needed to sell these products and services to farmers through the mass media.
4. The agricultural industry is becoming increasingly aware of the importance of good public relations. Agricultural organizations are concerned about their relations not only with farmer producers, but also with the nonfarm public, upon whose understanding agriculture must depend more and more as the number of farmers declines.

These changes are being felt in a lopsided job-to-graduate ratio that is giving the qualified agricultural communications graduate an

edge in pay. During the past few years, starting salaries of graduates in agricultural communications have averaged above \$6000 a year; above \$10,000 is common three years later.

A college education is necessary for most of the openings today. Some young people interested in agriculture take a major in journalism and supplement it with farm background or added coursework in agriculture. Others major in agriculture and minor in journalism.

Pressures for more qualified people have prompted members of the agricultural communications industry to swing into action. One example is the 17 firms teaming up with the University of Illinois in an effort that produced eight new \$300 agricultural communications scholarships for the 1965-1966 school year. The scholarships were awarded to incoming freshmen and transfer students on the basis of interest and outstanding promise in the agricultural communications field. The students are taking courses in the humanities and physical, biological and social sciences along with their work in communications and agriculture.

The University of Illinois Office of Agricultural Communications asked a group of 16 leaders in this field to serve as an Industry Advisory Committee in Agricultural Communications. After several months of study and a meeting in May, that committee this month submitted its 12 recommendations.

Their "12 Recommendations on Education in Agricultural Communications" for the University of Illinois are summarized below:

1. The University should have a goal of 50 graduates annually in agricultural communications, with 20 going for advanced degrees.
2. Establish a National Council for Education in Agricultural Communications to encourage support for career programs in this field at Illinois and other universities.
3. Encourage agricultural advertising industry to create career promotion advertisements to be carried as a professional service by print and broadcast media.
4. Expand career information efforts, including speakers bureau, contests and awards for high school students, and other effective career materials.
5. Continue industry-supported scholarship program and add one graduate assistant to help with career information programs.
6. Colleges of Agriculture and Journalism and Communications should increase their support for the agricultural communications curriculum.

7. Agricultural Communications curriculum should include instruction in data analysis and in principles of design and graphic arts.
8. College of Agriculture should consider requiring an introductory course in communication methods for every undergraduate student.
9. Agricultural industries, advertisers, and media should help expand summer internship programs in agricultural communications.
10. Office of Agricultural Communications should involve more professionals from industry to help enrich its academic curriculum.
11. Investigate possibility of providing a central service for exchanging information on available candidates and positions in agricultural communications.
12. Encourage academic and business professionals to exchange places for brief "self-renewal" programs in the two environments.

In its August 4 transmittal letter, the Industry Advisory Committee, represented by Richard J. Cech, vice-president of Marsteller, Inc. (and a K-State journalism graduate), and Donald D. Dilworth, director of advertising for Deere and Company, said this about the field of agricultural communications:

We in the industry have been playing a losing game of robbing each other of our best men. We have been perplexed by the fact that relatively few land-grant universities seem to be interested in supporting academic programs in agricultural communications. And we think something should be done about it.

At Kansas State, discussion has been underway for sometime on a plan to upgrade our agricultural journalism program. This would be part of an overall program for improvement of the journalism curriculum, part of which will go into effect this fall.

A journalism major takes a maximum of 30 hours of course work in journalism. There is some room for flexibility, but required courses in the basics of reporting, writing and editing account for 12 of the 30 hours in journalism. The agricultural journalism major takes the same required courses as any other journalism major.

There is only one course specifically for agricultural journalism students. We are hoping to add a course in technical writing which could be of value in a number of curriculum options.

For a nonjournalism major, a three-course sequence in Survey of the Mass Media, Agricultural Journalism, and Technical Writing (still

to be approved) would provide a good background combination for agricultural communications.

The K-State journalism faculty is working also on a professional semester plan which could be of value in giving professional experience to ag journalists at the same time they are completing requirements for a degree. The heart of the professional semester plan is a Journalism Practicum, similar to the practice teaching experience of a student in education. This has many possibilities for ag journalism students.

So far as what is new in teaching in ag journalism, I am afraid that I can not shed too much light on an area that is Elbert Macy's concern. I do know that some interesting things are happening in most of our journalism classes as we strive to get that perfect blend of practical and theoretical knowledge into our courses.

I would be delighted to talk with any of you concerning our journalism program. Please feel free to present any questions or concerns you might have about the relationship of agriculture and journalism.

Reported by: Del Brinkman

Agricultural Mechanization

One of the developments in the Department of Agricultural Engineering that promises to improve teaching effectiveness and efficiency is the application of models to the study of field machines. Two examples of such equipment now being designed or constructed are a soil bin and a field sprayer demonstration unit.

The soil bin is useful both for research and teaching. It is to consist of a bin about four feet wide, 80 feet long and 24 inches deep with a dynamometer carriage riding on rails along its sides. Speed of the carriage is controllable and it is to be instrumented to measure x, y, and z forces as well as rotational moments.

Uses for teaching are many and include the following rather obvious applications:

1. Determining relative importance of factors that influence the efficiency of tillage tool operation such as effect on draft of depth of tillage, speed, adjustment, and shape.
2. Illustrating how various adjustments influence the center of resistance and line of draft of tillage tools.
3. How adjustments and mode of operation influence the kind of seedbed that is prepared.

4. How tractive efficiency and rolling resistance are influenced by weight, soil conditions, and type of soil contact element.
5. Degree of soil compaction by various types of equipment.

The spray demonstrator drops the discharge from nozzles onto a corrugated metal sheet from which the runoff can be collected and measured. It will facilitate nozzle calibration, analyses of spray patterns, and demonstration of the influence of such factors as fluid pressure, nozzle spacing, nozzle height and wind velocity.

Those and other models we hope to develop are useful for certain research as well as for teaching. They enable us to isolate factors that cannot be adequately controlled in field exercises. They facilitate course planning by reducing dependence on weather and availability of field equipment. They can be instrumented more adequately than field equipment. For the students they will illustrate research methods with a broad range of application.

Reported by: Ralph Lipper

Animal Husbandry

Since Animal Husbandry has such a broad scope, covering four species -- beef cattle, swine, sheep, and horses -- many new methods are being applied to adequately teach the science required while being mindful of practicality. Animal husbandry students receive a broad foundation in the basic sciences (mathematics, chemistry, physiology, genetics and others) before starting their major course work. A very brief discussion of teaching methods used to cover major areas in animal husbandry: nutrition, breeding and genetics, physiology of reproduction, meat science and animal production, follows.

Students in animal nutrition are taught not only how much the animal needs but why. That includes grass utilization as well as feedlot studies and it involves rumen fistulated animals, artificial ruminants, and the techniques of feed analysis and its fallacies. Energy is expressed on a calorie basis, which is explained by demonstrating the bomb calorimeter. Scoop shovels are out and computerized rations are in. Letters from farmers and ranchers are used to discuss actual field problems.

Breeding and genetics classes are exposed to many films explaining genetic principles, which brings the laboratory to the lecture room. Students learn why dwarfism occurs and what can be done to prevent it, which involves chromosomes and their functions. Crossbreeding is not new in principle but it is new in action. Which cross is the best under a given situation?

Another change in the teaching of biochemistry has to do with course content and emphasis. In keeping with an almost universal trend, many of the courses offered by the Department of Biochemistry are placing greatest emphasis on the chemical aspects of biochemistry.

Interest in biochemistry has been increasing across the campus. In an attempt to meet the needs of those desiring training in biochemistry, the Department of Biochemistry has introduced a new sophomore level service course that will be offered for the first time next spring. However, if the Department of Biochemistry is to fulfill its obligations to the ever increasing number of students at Kansas State University who wish to take biochemistry, it will need much more laboratory space than it now has.

The Department of Biochemistry has recently submitted a proposal to the National Science Foundation for funds to support a summer institute in biological chemistry for secondary school teachers of biology and/or chemistry. If funded, the institute will be offered next summer.

In the near future the Department of Biochemistry will also submit a proposal to the National Institutes of Health asking for support of three year pre- and postdoctoral training. If funded, that program will begin next summer.

Reported by : R. K. Burkhard

Dairy and Poultry Science

Curricular development in the Dairy and Poultry Department is a dynamic thing, proceeding continuously. There is evidence that our area of specialization is changing at an accelerated rate and it is hoped our changes in instruction will be viewed as attempts to advance in step with an advancing technology.

We are offering on a regular basis three courses, each of which have two instructors. Each instructor is a specialist in his own field.

Artificial Breeding of Farm Animals is taught by a member of the Dairy and Poultry Department in combination with a member of the Animal Husbandry Department. Such an arrangement is working well with economies in teaching time and material.

Genetics of Poultry and Dairy Cattle is another example of a combined course in which one instructor does the lecturing and the other instructor specializes in laboratory exercises. Such a cooperative arrangement has led to increased interest on the part of the student.

Physiology of reproduction is the newest field in animal husbandry. In artificial breeding, students are taught how to collect the semen and how to inseminate females. Advanced students are taught how to hypophysectomize an animal to study pituitary hormones and their influence on body functions. That involves gas anesthesia along with other modern laboratory equipment. The animal is prepared for the operation and the brain is exposed. We have one of three such laboratories in the United States.

Meat science has taken on a new perspective. The whys of muscle contraction, rigor mortis, muscle fiber diameter and other factors that influence meat are taught. The effects of different forms of light on meat and "why" are taught using slides and actual classroom demonstrations.

No area is complete without production and it is perhaps the most difficult to teach. A tremendous teaching tool is live animal-carcass evaluation. Students view animals alive, make estimations and then find out how close they were by carcass evaluation.

Livestock evaluation is dynamic and changing to better meet modern demands. By using live animals in the laboratory and applying basic principles, the student has to develop:

1. a systematic approach to the problem,
2. good reasoning ability,
3. a keen sense of observation and the ability to communicate his ideas to other people.

Special problems can be a tremendous stimulant to students, and more of these are being developed in animal husbandry.

Although "not new" the greatest single factor we have in animal husbandry is the attitude, enthusiasm, and desire of the faculty to properly train and to stimulate our students through teaching and counseling. Without those, our laboratories, classrooms and modern teaching aids would be useless.

Reported by: Calvin Drake

Biochemistry

One change in the teaching of biochemistry arises from knowledge in the field expanding so very rapidly. With that in mind the Department of Biochemistry has expanded its one-semester course for biochemistry majors to a two-semester course. Concomitant with the expansion, the decision was made to teach the new course by a team.

We have found that in a course such as Principles of Animal Science, in which the student numbers exceed 200, many of whom are freshmen, it is advisable to distribute outline material for each lecture so that the student can follow the instructor during class.

With these few ideas we hope our experiences will be beneficial to you.

Reported by: J. David Mitchell

Entomology

The Department of Entomology faculty includes 12 who are doing on-campus teaching and research and two extension entomologists. There is one survey entomologist employed by the State Board of Agriculture, with an office in Waters Hall. There is one entomologist at experiment stations at both Garden City and Hays. One is currently in India with the AID program. We also have a USDA entomologist in Waters.

The department has about 45 graduate students and 18 undergraduate majors.

Two years ago the department moved into newly-remodeled quarters in West Waters. The sources of the remodeling funds were NSF \$29,200, NIH \$110,000, State \$200,000. Architect's error's and other mistakes beyond our control will continue to cost much in the years to come.

We now have 46 laboratories, including 10 rearing rooms. Our "outside" research grants total about \$130,000 annually. There is a newly-equipped undergraduate teaching laboratory for 25-30 students and a smaller teaching laboratory for graduate classes. It easily accommodates 15 students. The teaching laboratories are adequately equipped with microscopes for students but acoustics are bad.

A considerable amount of movable equipment for teaching and research has been purchased in the last two years. About 5% of the remodeling funds were allocated for movable equipment and most of the remainder from outside grants.

An NSF Instructional Scientific Equipment grant of \$7800 recently was used. About one third was used to purchase a closed-circuit TV system. It includes a camera with a 100X lens, and two monitors. This equipment will make it possible for an entire class to observe a small field at the same time, e.g., the behavior of small insects in a restricted area, or a part of the external or internal anatomy of an insect. Other equipment obtained included a phase microscope, table saw for use in building cages, and observation nests, Riker mounts, and a movie film.

Changes have been made and are being made in the entomology curriculum and in some of the courses. The faculty recently approved a revised program for undergraduate majors. It includes languages and more science courses in the science option. Although all instructors make changes in their courses from year to year, the laboratories of two courses are now receiving particular attention. The laboratories of Economic Entomology and Advanced Applied Entomology are receiving major revision. The Economic Entomology laboratory instruction, especially, will place more emphasis on economic insects. Dr. Knutson and others involved with teaching the laboratories have spent much time this summer revising the content and methods. For additional ideas, Dr. Knutson wrote to other entomology departments over the country and inquired about their laboratory teaching. He was amazed to find several that have no lab; and several others who apparently play it by ear, with no printed directions. Dr. Elzinga spent much time this summer designing and preparing a new graduate course in Arachnology. It deals with spiders, scorpions, ticks, mites, and other such arthropods. Derrick Blocker has taken over the External Insect Morphology course.

Another activity of the department, which may be very significant in evaluating the quality and content of instruction, was a questionnaire that was mailed to those who graduated from our department since 1960. Charles Pitts was in charge of preparing and sending the questionnaire which, among other things, requests of each graduate the following information:

1. Courses he feels should be in the core curriculum of the department.
2. Courses he did not take that he needs.
3. Departmental courses taken that he has found most and least useful.
4. Entrance requirements he feels students should have to enter graduate study in our department.
5. Opinions on the facilities, advising, etc.
6. Any constructive criticisms the graduate wishes to make.

It is hoped that the results of the survey will be valuable to the department in improving curriculum and teaching.

During the past two years we have had an NSF Undergraduate Research Participation grant to support the research of two undergraduates.

We have new slide and overhead projectors.

Display boxes of insects now line the hall on the first floor to aid students in identification of insects.

For a few weeks at the end of the semester some of the faculty members have opened the undergraduate teaching laboratory at night so students can study specimens and work on their collections.

Carl Rettenmeyer has taught Tropical Entomology at the Organization for Tropical Studies in Costa Rica on two occasions. Two of our graduate students have studied there.

This year the Entomology Seminar will be held weekly for 2 hours each session. Most presentations will be made by graduate students. Ph.D. candidates are required to participate in the seminar one semester each year.

Reported by: Robert Mills

Extension Education

Four courses are taught in extension education for upper division and graduate students. Two basic courses at the upper division and graduate level are Extension Organization and Policies (Ed. 605) and Extension Teaching Methods (Ed. 752). Two courses are taught at the graduate level, Adult Education (Ed 816) and Extension Program Development (805), the latter on demand only.

Students at the undergraduate level may take extension education courses as electives or they may choose one of two options. A new option termed agricultural services for men students was recently added in the College of Agriculture for those interested in extension education and other related occupational areas. In home economics, women interested in preparing for a career in the Cooperative Extension Service may take an extension option in family and child development.

A master of science degree in extension education is offered through the College of Education. A core of four courses for twelve credit hours is required. The courses are Extension Organization and Policies, Extension Teaching Methods, Adult Education, and Research Methods and Treatment of Data. A minimum of nine semester hours must be taken from a list of associated courses. Many students take supporting courses in extension education at both the M.S. and Ph.D. levels.

A tentatively planned graduate program is developed for each extension education graduate student before he begins course work. The program is similar to the one later submitted to the Graduate School, but is for the benefit of the graduate student and his advisory committee. Considerable time and energy is devoted to advising graduate students. By enforcing early planning, we believe it possible to develop a stronger academic and research program for each student.

Considerable thought is being given to ways to improve the extension education curriculum. Kansas State University is one of 17 states cooperating in a national project to improve curriculums in extension education. Representatives from the states meet twice yearly for one week. Dr. Ralph Tyler, nationally and internationally renowned authority in curriculum development, is serving as consultant to the committee. Dr. Tyler has been a consultant to members of the medical profession, to physicists, to mathematicians and to those in other academic disciplines.

Under Dr. Tyler's direction, we are attempting to identify the concepts most relevant to our profession. The concepts are primarily from the social sciences and the humanities. Disciplines and academic areas from which we are presently seeking concepts include administration, adult education, anthropology, communications, economics, education, educational psychology, philosophy, political science, social psychology, and sociology. The concepts are to be screened twice: first, by authorities in each discipline who attempt to identify the most relevant concepts in their fields; second, by experts or authorities in the Extension Service who select the most relevant concepts, based on expected behavior of professional extension faculty. Each concept is to be described briefly with examples of its application and discussed in terms of application in extension teaching. A bibliography as a source of further information is to be developed for each concept.

Reported by: Robert Johnson

Grain Science

We use some textbooks, but none covers more than half the subject matter desired. The remainder is supplied from notes by the teacher, and by copies of research material supplied or referred to in a library.

It is found highly desirable to put the important material in writing on paper for each student. Mimeograph or ditto duplicated material is sometimes furnished.

Another very satisfactory method is to have copies "Xeroxed" by the University Press. Any material 8 1/2 x 11 can be duplicated in lots of 500 pages or more at a cost of about 1¢ per page. The printed copies look as good as or better than the original in most cases.

It has been very helpful to both students and teachers to use flip chart instructions in type about 1/4 inch high. Such instructions are mounted on stiff fiberboard and left by each laboratory machine that requires detailed instructions. The material is condensed from instructions furnished by the manufacturer, by association bulletins, or by the staff.

A third method is to use films prepared on the job. We have been very fortunate in having a highly qualified movie photographer from Minneapolis, Minnesota, prepare our films. He comes to Manhattan for several days at a time, with all the cameras, lights, and film necessary, and works with out equipment under the direction of Arlin Ward and others in the department. This man, William R. Carter, supplies his time, materials, etc., because of his interest in the work and desire to be of hlep to us and to the milling industry.

Two 35-minute films of professional quality have been thus prepared on the subjects of "sifting" and "roller mill grinding."

Using high speed cameras, sometimes shot as fast as 5,000 frames per second, slow motion films show many things that happen in sifting and grinding that could not be seen in any other way.

The films are used as part of classroom teaching and are shown to meetings of millers all over the world. They are excellent promotional films for our department.

We hope to continue with Mr. Carter.

Reported by: E. P. Farrell

Office of International Agricultural Programs

The Office of International Agricultural Programs does not operate a teaching program. Staff members function as advisors and counselors to students sponsored by the United States Agency for International Development. Students sponsored by other international organizations are also serviced by the staff. Our office serves as the focal point on campus for such sponsored students who are, in the main, majoring in agriculture, home economics or veterinary medicine.

Several supporting roles are filled by IAP staff members. One such role is assisting the dean of foreign students. Staff members help plan the annual orientation for foreign students and serve as resource persons in presenting the orientation program. Practical training for students in field situations is usually arranged by the staff in consultation with the students' major advisers. Group tours and field trips are conducted by the staff during vacation periods and between semesters. Emphasis is placed on extension, research and agribusiness operations. The staff counsels with the students' major advisers in developing research of an applied nature that will have relevance to situations existing in his or her home country. It is essential that both student and adviser understand the great need for training and research of a practical, applied nature.

The staff plans and organizes a series of non credit seminars for international students in agriculture. Information presented deals primarily with the land-grant college system and its four interrelated functions, i.e. teaching, research, extension and international programs. Deans, directors, department heads and outstanding researchers conduct the seminars.

Preparatory discussions and study are underway with the objective of developing an inter-disciplinary seminar in international agricultural education and development. The seminar would carry graduate credit, one or two hours, and be open to all international students as well as U.S. students. All interested faculty would be welcome to attend and participate. Seminar topics would be general in nature, broad in scope, have wide application and be deep in insight and understanding of developmental processes.

The Office of International Agricultural Programs is supported by a permanent advisory committee. The committee, composed of ten faculty members, also functions as the inter-university evaluation group on international agriculture.

Each year many international visitors are channeled through IAP. The majority are on brief visits to the state while others enroll as special students in nondegree programs. Such visitors are directed to the colleges and departments that can provide information the visitors are seeking.

IAP sponsors still another activity. It is a special four-day orientation program, conducted as the need arises. It is designed to orient staff leaving for foreign assignments to life in a different culture, their responsibilities as "grass-roots diplomats" and their roles as technicians abroad. Returned faculty from India and Nigeria play a major role making orientation program meaningful.

In summary, the IAP staff administers a technical assistance program in India and Nigeria, operates an international supply organization, recruits faculty to fill positions on KSU teams abroad, develops programs for international visitors, sponsors practical training for international students, serves as a focal point for international agriculture at KSU, performs a liaison role among the college of agriculture, the dean of foreign students, and departments in all colleges and counsels, advises the guides international students (in coordination with their major professors) while they are studying at Kansas State University.

Reported by: Warren L. Prawl

Plant Pathology

The basic concepts of teaching undergraduate plant pathology are undergoing changes in all parts of the United States. Actually, there are two main avenues of thought. Several departments are developing, or have developed, programs to prepare students for undergraduate degrees in either plant pathology or, in combination with other departments, for undergraduate degrees in plant pest control. Their argument is that there are many professional positions that could best be served with more plant pathology training on the undergraduate level.

Others contend that under the course requirements of most schools of agriculture with plant pathology such an intergrated science, it is essentially impossible to turn out an undergraduate with sufficient training to be labeled a plant pathologist. The later group prefers to develop their programs for students going into graduate school. Recently an undergraduate program was developed in plant pathology at Kansas State University. For all practical purposes, it is designed for students who plan to enter a graduate school.

Several of the students in our undergraduate course are from outside agriculture and have not had the stated prerequisites. In such cases at KSU, and this is true at many institutions, all that is being required is an expression of genuine interest in the subject matter. That will be a commoner practice as core programs are further developed in biology.

The mechanics of teaching are also changing. Many new aids are being developed. The American Phytopathological Society has developed several aids for undergraduate teaching in plant pathology. Plant Disease Profiles (2 x 2 slide series), A Sourcebook of Laboratory Exercises in Plant Pathology, and a special issue of Phytopathology "The American Biology Teacher" are some of the more recent aids available.

Lectures deal more with concepts and principles, and in laboratories more emphasis is being placed on open-end experiments. That places much more responsibility on the student but it can be handled so plant pathology becomes a living, dynamic experience. That is quite a contrast to the classical method of memorizing symptoms and Latin binomials.

Reported by: O. J. Dickerson

"THE AG STUDENT"

David G. Danskin
Counseling Center
Kansas State University

A first imperative, for colleges wishing to improve their effectiveness through modifications growing out of regular program assessment, is to have some way of keeping in touch with what the educational experiences mean to their students. Counseling centers, in particular, are especially charged with the responsibility of assisting the college in attending to these processes of student development. As a result, a considerable amount of Counseling Center effort at Kansas State is devoted to studying, synthesizing and reporting to data on the characteristics of college students to the campus.

In the past, the Counseling Center has focused on data from tests, questionnaires, student records and the like. Such data, on Ag students specifically, were the main part of a report prepared by Counseling Center members at the request of the College of Agriculture Curriculum Committee in 1964. In that report, an attempt was made to add what frequently is missing -- to present not only data and interpretations, but to add implications of the data for curriculum planning and teaching. Excerpts from this report (which later was published¹) are reproduced below under the heading "Attitudes and Ambitions of KSU Ag Students." Results of study are in regular type and implications are in italics. Our current data suggest that those reported below are reasonably accurate reflections of currently enrolled students.

In 1965 we undertook to develop a method for studying regularly throughout the school year the on-going experiences as reported by students in weekly group discussions across the campus. That pilot phase has been carried on without additional staff. However, starting in September, 1967, we will receive substantial funding assistance from National Institute of Mental Health to implement the program formulated the past two years. The additional funds should enable us to make available to staff and students considerable information on what kinds of experiences have what effects on various "types" of KSU students.

One of our groups in the two-year pilot study has been high school valedictorians and salutatorians in the College of Agriculture.

¹Danksin, D. G., J. M. Foster and C. E. Kennedy. The Attitudes and Ambitions of Students at a Land-Grant College of Agriculture and Their Implications for Curriculum Planning and Teaching. Bulletin 479, Manhattan, LAES, 1965.

Some sketchy preliminary results of their first year discussions are given below in the section titled "Ag Students Report on the Experiences at KSU." This is followed by a section "Faculty-Student Relations: What Some KSU Students Say About Faculty," in which excerpts are presented from a more comprehensive summary of the reports of all student groups.

Attitudes and Ambitions of KSU Ag Students

Family, community, and high school background

The parents of Agriculture freshmen were in elementary school during the depression years and the "Dust Bowl" era.

A common reaction to phenomena such as a depression or a "dust bowl" is to want to acquire (or have one's offspring acquire) something that can't be lost, to "acquire security." Education is seen by our students' parents, and hence by the students, as a means to security -- as acquiring tangible facts, skills and information that are not destroyed by economic conditions nor "blown away" by the quirks of nature.

Sixty-five percent of the Ag students' mothers, and 70% of their fathers had a high school education or less.

When a person has not experienced something, his ideas about it frequently are inaccurate. More specifically, parents' lack of college experience can leave them with some understandable misexpectations (misexpectations that their children acquire): parents think of college courses and college grades as similar to high school, college courses teach one how to do things (when to plant what, how to mill wheat to flour, how to be a lawyer or an accountant), "C's" were "bad" in high school so "C" in college must also be bad and to get a higher grade a student just has to work a little harder than when in high school.

The occupation of 69% of the fathers is farming, with another 3% in agriculture-related jobs. An additional 13% hold professional-managerial positions, 5% are in clerical and sales, 4% in skilled occupations and 3% in semiskilled and unskilled jobs; 85% of the mothers are homemakers.

Farming, skilled, semiskilled jobs are concerned primarily with practical problems -- with getting something tangible accomplished such as tilling the soil or machining a part. This is what life and work are to the entering student. With his experiences, what else could he expect college to be like?

About 82% of the freshmen in the College of Agriculture come from towns of under 10,000 population; 44% have home towns of fewer than 1,000 population.

Coming from a small town, the Ag student feels responsibility not only to family expectations but also to community expectations. Since the entire community expects him to continue the "successes" he demonstrated as a high school student, as a college student he has less freedom to evaluate and experiment with alternatives (to do so might jeopardize his grades and expected success). He isn't free to decide not to continue college.

The way of life of a small town can be quite predictable -- a student knows who does what, what each thinks and what each will do. This may make it more difficult for him when he gets into a less predictable situation. He'll be less likely to take such risks as trying new ideas. Also, the number and variety of jobs are limited, giving a narrower number of occupational choices than students from larger cities are aware of.

Knowing these things, then, a professor can predict somewhat the characteristics of the students as they enter college. They will be motivated by expectations that college will give them something secure -- some know-how, skills and facts to solve practical problems in some secure job. Further, they will want to be like the professor, as they see him -- will want to have the facts, skills and information he possesses, which he'll never lose, and which make him a needed commodity. Students will wait for the professor to tell them what skills and facts to acquire, how to acquire them and how to use them. Also, they will need the professor's encouragement and his interest in them as individuals.

Perceptions and expectations of KSU

Sixty percent applied only to KSU; 23% to some Kansas junior college; 7% to Kansas colleges other than KSU, and 8% to out-of-state colleges.

Why did he choose KSU? Listed are the reasons and percentages of students who checked that reason: The department in which I wish to work has an outstanding reputation, 61%; Parents, 47%; Campus events for high school age students, 37%; Vocational agriculture teacher, 32%; I like the campus, 30%; Leaflets and brochures from KSU, 30%; My friends were attending KSU, 27%; The friendly atmosphere on campus, 25%; FFA contests on campus, 20%; Older brothers or sisters at KSU and close to home, 18%. Reasons for coming to KSU and reasons for selecting his college (Agriculture) or his major correlate highly.

Students come to KSU expecting college to be a continuation of their lives and what they've known, rather than as an interruption to explore a different world or way of life. Students come from agrarian backgrounds, most apply only to KSU (rather than venturing to some out-of-state school or one that's different from their rural up-bringing), KSU is the school with THE reputation in Agriculture. Vocational agriculture teachers and parents (many of whom farm) are the most influential persons in the decisions to attend KSU. And, besides, it's a friendly place, like the home town and high school, though it's bigger.

Entering students typically see KSU and their parents similarly -- as benign and powerful figures. By coming to college, the students feel they can acquire the facts, figures and knowledge possessed by those at KSU. As a result of getting this information, the students feel they will be more like their parents and those at KSU -- will acquire greater self-esteem and personal power. Failure to graduate is seen as a very deflating experience, which damages one's personal worth and effectiveness.

He may come looking for the "what-to-dos," "how-tos" and "whens" rather than the "how-comes" or "whys". He may want to get the facts, skills and answers he thinks are required to hold a secure job.

This means that he might be neutral toward, or will react against, general education courses, unless they are related to jobs and job mobility. The importance of history and such courses will be quite abstract to him. He might see them as something imposed on him by other people and for irrelevant reasons that have little or nothing to do with his life. To interest him, they will need to be related to his world.

Very probably, he'll be more likely to "take to" less technical courses after he has acquired some practical knowledge of the sort he came to college to get in the first place.

Should a college arrange its curricula to give something tangible initially, thus enhancing the chances of a student feeling secure enough to explore and be a little venturesome?

Academic potential and motivations

Entering students of all levels of ability tend to overestimate the first-semester grades they are most likely to receive, with students of lower potential tending to be more overly optimistic than those of higher potential.

The tested academic potential is rising, on the average, every year. Still, compared with men in other KSU colleges, the Ag frosh tends to be average or below on all four parts of the American College Test -- a measure of knowledge and use of grammar and of high school algebra and geometry as well as ability to read and understand social science and natural science materials.

The academic abilities in his fellow students will cover the full range found in any college, from the most gifted to those in a group having one or two chances in a hundred to earn a 2.0 average or higher.

At least 95% of entering frosh have more than the minimum academic potential needed to earn 2.0 or higher grades. Academic difficulties partially stem from the typical Ag student's below-average English knowledge and skills and below-average reading skills. Those skills and knowledges are most important for satisfactory work in most college courses, be they math, history or chemistry. The Ag frosh's lack of superiority, on the average, in those areas results, in part, from the lack of their being important in his home, community and the way of life of those he associated with during his first 17 or 18 years. He probably will continue to have difficulty in recognizing their importance.

He is energetic and motivated, particularly when working on practical problems and when in a structured situation -- when there is a well-defined organization, pattern of operation or explicit statements of what is expected. He is more motivated to become qualified to earn a living than to develop an elegant theory or to philosophize.

He is energetic and motivated. He will be most likely to work hardest in situations dealing with problems he sees as related to the job he came to prepare for. When he feels he is getting practical and tangible knowledge, he, then, might be able to deal more comfortably with more abstract and basic knowledge.

Compared with men in other KSU colleges, he is more reluctant to venture an opinion, express his ideas or feelings or draw attention to himself; is less sure of his ability to compete; and wants encouragement, understanding and to know that others are interested in him, though he is reluctant to solicit any of those. Continuing the comparison, he is less aggressive and venturesome in words and actions, less scientifically oriented, more of a problem-solver and doer than one to reflect on events and ideas, and prefers routine and sameness over change.

He most likely will do his best work if, in the early stages of college or of a course, he is given a good deal of structure and if he can feel that others are interested in him and encouraging him. Once he senses that this is the case, then he will feel freer to venture his opinions and ideas.

Academic performance and academic patterns

The average first-semester Grade Point Averages (GPA) for Ag Frost (1960-64) were 1.65, 1.45 and 1.76, 1.85, 2.01 respectively.

Around 53% of an entering freshman class will graduate from KSU. Of an entering class, about 25% will graduate in their original major; others will change majors an average of 1.4 times. Chances are that a student who is dismissed or drops with a GPA below 2.0 will not have changed majors.

What do students who change curricula say is important in their decisions to change? Vocational interests and types of jobs available were rated as most important, with less concern shown for such matters as characteristics of faculty, abilities, and characteristics of academic programs. Students say that they get information important to curriculum planning primarily from parents and friends (fellow students) and the same two sources are most influential in decisions to change.

Again, the continuation of the way of life the typical Ag student brings to K-State. As large a percentage of students in Agriculture as in any KSU college stick with their original major. The choice of a major is most linked with the future job, and advice in selecting a major comes from those the student knows best and with whom he feels most comfortable.

Nearly half the students will work part time, though this won't affect their grades (except when a student has quite low ability and/or holds nearly a full-time job along with full course load). Also, the type of living unit (dormitory, fraternity) will not be related to achievement.

Ag Students Report on the Experiences at KSU²

During the past two years, eight students in the College of Agriculture who were valedictorians or salutatorians in their high school graduating classes met weekly. During that hour together they discussed experiences of the week that had had significance to them in terms of

²Excerpts from Kennedy, C. E., W. Ogg and D. G. Danskin. "Ag Group ---Year in Review", Fall, 1967.

their growth and development in college. Mr. Ogg, of the Counseling Center, was "debriefed" after each meeting and the debriefing dictation was transcribed. What follows is a brief summary of what those students discussed the first year.

As one looks back on the progress of that group through their first year of college, he is impressed with the idea that the students had been accustomed to being responsible leaders in their high schools. Their biggest adjustment, and perhaps the one that they never really were able to accept without considerable frustration, was that in college they no longer were in a position to know and influence the intimate workings of the school.

They had looked forward to college as freeing them from the situations in high school where they had to disguise their academic interest from their peers. They had some anxieties about their ability to compete with other students at Kansas State. There were times when they, in moments of depression, desperately wondered what they would do if they should fail out of college.

They seemed to experience throughout the year a feeling of vulnerability. They felt their lives caught up in a process whose inter-workings was remote from them. Near the end of the first semester, as they were anticipating final exams, they talked about how all of their work of the semester could be washed away if they failed to get the hang of the final exam. Administrative mistakes in recording grades and confusion in some scholarship funds emphasized their feeling of remoteness from the machinery and left them feeling alone and without a friend in power.

They continually quizzed one another about anything that had been heard regarding various courses, about enrollment procedures, about dealing with the draft. They had the feeling that there was "somewhere" a fund of information that they didn't know how to tap. For example this feeling of being on the periphery was expressed in terms of student elections. All had read the articles about the election in the school paper. They did not vote however because they did not feel they knew enough about the people and particularly they didn't know enough about what could be accomplished on the campus.

They took considerable pride in a Collegian editorial which acknowledged that the Ag College had a good advising system. They recalled with considerable satisfaction the difference between the treatment they got during pre-enrollment in terms of being introduced to their college as contrasted with the less warm welcome that some of their friends received who were enrolling in other colleges on the campus. They seemed to accept the fact that the special personal interest they received in pre-enrollment could not continue during the year. But they never gave up hoping for more opportunities to know and be known by their teachers. One boy expressed with wry humor their feelings when he said,

"I am just a number. I have a number in Chemistry, an English number, and a Phys. number."

The students still maintained a strong interest in their home communities -- reminiscing on high school experiences, attending some high school games. They much enjoyed talking about farm topics, price of hogs, the government's attitude toward the farmer. They didn't bring much of their college experience to the discussions of farm issues. They seemed to say that they had not been able to relate college to their lives yet. For example they had mixed feelings about the Ag. and Society course. In some ways it seemed to be the kind of thing that they wanted; that is, having the opportunity to know people from the various areas of agriculture. However, even though the representatives were present they were still remote. Their lectures seemed to be the lecturer talking to himself and the students not having enough opportunity to relate it to themselves. If the lecturer could have been sharing a meal with them they would probably have much more easily seen a relationship between his area of agriculture and their experience.

In summary this is a group of intelligent responsible young men (and one woman) who have completed a year of successful work at Kansas State University. The experience seems to have been fragmented academically and lonely socially. We would hypothesize that, in some ways, their sense of identity is less secure than when they came to Kansas State. They came from situations where they were known as leaders among farm youth. Here, for the most part, they have not found very much in the way of a group with which to identify. Dormitory life has been, for many, unsatisfying and the "College of Agriculture" has been an impersonal series of courses.

One might hypothesize (against the background of some conversation on campus concerning Resident Colleges or College Houses) that something like a living unit identified with the College of Agriculture, with Dean Hess as the Honorary Resident and with the college taking an active interest in the house, would probably meet many of the needs expressed by this group of students this year. A college house might provide the means by which the students could have more informal contact with their teachers. It could provide a center to which the students could look for the fund of information that they feel they are missing. It could provide a sense of identity and esprit de corp that is more frequently found in identifiable living units like fraternities. The identity would also come from getting to know and to feel a part of the thinking of the College of Agriculture.

Faculty-Student Relations: What Some Students Say About Faculty³

What follows was taken from a summary of what seven groups of KSU students, meeting weekly for two years, reported regarding their exper-

³Trotter, Marilyn B. Faculty-Student Relations: What Some Students Say About Faculty. Manuscript submitted for publication, August, 1967.

iences with faculty. Two hundred and fifty-three entries from the group interviews were coded under the topic of faculty-student relations. For purposes of analyses the comments were then subdivided into thirteen categories or sub-topics. Fifty-six of the entries were classified under the sub-topic, "students' desire to be known as individuals to the faculty." When the comments from four additional sub-topics ("faculty's communication of interest in students," "students' perceptions of trustworthiness of faculty," "faculty's attitudes that estrange students," and "faculty's presentation of course material") were added to those under "students' desire to be known as individuals to the faculty" 203 of the 253 entries were accounted for.

There were frequent paradoxes in the data. Students repeatedly expressed the desire for faculty to be more human and to let the students know them more candidly; but when the professor's human frailties (such as the failure to recognize students in the corridor or call them by name in class, lack of omniscience in subject matter, and display of temper) were encountered, the students expressed strong criticism. Even though the students spent a considerable amount of time talking about the frustrations they experienced with the teaching methods of the faculty and of being bored in class, they volunteered very few tangible suggestions about how to change the situation. One group of students thought that the student shared the responsibility with the instructor for attempting to make the class meaningful; however, they feared retribution if they confronted an instructor with the report that his class was not meaningful.

A very strong and pervasive theme throughout the weekly discussions was the students' distrust of the faculty, and often the expression of this distrust was accompanied by evidences of strong feelings. The distrust was associated with advice about the kind of examination that would be given, about what to study for the examination, and about curriculum planning. They felt that some professors were trying to push them into undesirable courses and that other faculty were not well enough informed on graduation requirements. Students were usually afraid to express an opinion in opposition to the one held by their instructor. This fear included attitudes on academic matters but was more intense when personal or social topics were discussed. Students often felt "let down" when they discovered that professors were not the ideal models of professional people whom students had associated with career plans. Only seven of thirty-nine entries in the sub-topic, "students' views of the trustworthiness of faculty," could be termed positive.

Frequent references were made to faculty attitudes and behavior of which the students were critical. Instructors who swore, yelled, introduced humor that fell flat, expected too much from students, and who were unorganized or sarcastic were criticized and disliked. Students were less vehement in their criticism of lecturers who were suspected of giving the same lecture year after year, who followed the text verbatim, who spoke in a monotone, who did not stick to the subject, or who had an unusual manner of dress.

Not only did students desire more "feedback" from their instructors, but they also wanted it in specific ways. They requested more frequent quizzes (especially of the essay type), more written comments on assigned work, and a change in the grading system (they felt the present, traditional method did not reflect what the students really experienced in the course).

Even though the students seemed to assume that it was part of the system for faculty to make it tough on students and perhaps even to try to flunk out as many as possible, they spent more time talking about how to get to know faculty than was spent talking about any other subtopic.

The students seemed to tacitly accept the idea that it was up to them to initiate contacts with the faculty, since the faculty had too many students to be concerned with seeking them out. Generally they were very hesitant about making this overture, but there were only eight instances in which students indicated that they did not want their teachers to know them personally. Rarely could students even contemplate approaching a professor in his office for any reason other than to make a specific inquiry about the course. A majority of the students seemed to feel that most faculty would respond courteously if they were approached in their office with such a legitimate and tangible request, but few students had made such visits. One sorority girl reported that her sorority strongly encouraged members to get acquainted with all of their instructors. As she enthusiastically shared this information with fellow group members, she emphasized that "it works."

In general the students seemed to feel that they had entered a world dominated by a powerful system that they were continually struggling to understand. They had a feeling that there was a source of information; and that if they could find it, life would be easier and collegiate success more certain. They perceived faculty as aligned with the system against students and they felt they were more fortunate than most if they received individual attention from a faculty person whose competence and interest in them could really be trusted.

Now What?

What we know about our students can be interesting and informative. However, such data really become meaningful and viable as we begin to relate it to the teaching-learning process and to what we conceive of as "getting an education."

If the characteristics, aspirations and experiences of students, as reported in this paper, are congruent with our goals for ourselves, then we are "on easy street" -- the students' aspirations and personalities and their experiences at K-State are reinforcing each other. If, on the other hand, there are discrepancies, then we need to focus on what happens in college, on what kinds of changes are induced and on how to bring about the changes we desire.

That then leads on into this symposium. You'll be talking about teaching objectives and about teaching-learning as a process for change. To plan an educational program to encouraging change, more needs to be understood about the entering student and about the factors in the college environment that shape the experiences that influence students to change.

Your symposium is an exciting beginning. I hope you'll enjoy it and find yourselves caught up in a process that will continue.

Appendix

This is an appendix, to be read at one's leisure.

Switch, now, from the focus above on students. Rather, think back on your own college education. What did you get out of college? What experiences come most immediately and usually to mind? What events or experiences made a difference?

Are your recollections, as mine, of a relationship with a professor; something learned from roommates or friends or an experience on an athletic field or participating in some student protest of the day?

What do you hope college will do for your son or daughter beyond giving some preparation for a job? Do you think of personal qualities that you'd like to see develop: independent thinking, a sense of social responsibility, a capacity to judge people, resourcefulness to avoid boredom and the like.

I wish we had time to think and share together our recollections of college. Further, to think together about the conditions that lead to our desired outcomes. To think together on the ways in which we can reorganize our resources in planning an educational environment to bring about the desired changes.

We don't have time to think together, but I do want to share with you some excerpts. One of the most penetrating and exciting books on higher education is one just published, Where Colleges Fail by Nevitt Sanford. Sanford stands near or at the head of students of higher education. In his book, he unfolds the conditions for bringing about change in colleges. A few quotes.

"What the college teaches and how well are far more important, I believe, than how much it teaches -- explosions in knowledge notwithstanding. It is time for us to act on the knowledge that education is not a matter of how much content has been poured into the student and that educational growth is not a one-to-one correspondence with lectures attended. Dramatic changes can begin in a moment, under the

right circumstances, regardless of the amount of material covered. Oftenest those circumstances will involve a personal encounter between a student and an admired faculty member. Educational history may well be made by the first college that reduces the amount of material offered in its curriculum to give the faculty time to reach the students. The time has come for us to control our zeal for imparting knowledge and skills, and to concentrate our efforts on developing the individual student. This is not a new idea in education, certainly not to liberal educators, but in recent years it has too frequently been neglected in favor of professional training, which makes products of the college acceptable to the graduate schools and to industry. Colleges must take the lead in showing that the well developed individual is, in the long run, the really promising candidate.

"I am particularly concerned about these pressures because, as a teacher, I am caught up in them myself. Like other teachers, I assign about twice as much reading as a few years ago. The students, of course, manage this reading in the most superficial way possible. They read with the examination in view allowing themselves no opportunity to explore the pathways, to play with new ideas, to enjoy the pleasures of an intellectual life. If an instructor were to assign less reading than average, or permit himself to toy with ideas at the expense of presenting 'the facts,' the students would conclude that what he has to offer must not be important and that they were not getting their money's worth. We have helped to create in students a kind of slave mentality. They relieve their guilt by doing exactly what the hard masters require; and they express hostility by doing no more, by keeping their distance, and by making sure that they remain untouched in any important way.

"This is pretty grim, and it is hard to say where it will end. If one makes an effort to change the system, he is suspected of trying to lower standards. If he suggests that students have problems, he is accused of coddling them and told soundly that excellence of course requires sacrifice. I do not know whether it is an expression of the unhappiness of faculty members or whether it is due merely to our general participation in a belief system that is not adequately questioned. In any case, we are not proceeding in a way that will give us excellence in performance, either on the job or in life. Students trained in such a system become competent technicians but it is difficult to imagine their becoming leaders of society or highly developed individuals.

"Instead of judging a college's success by who goes there and how well they are expected to do, I want to suggest that we focus on what happens at the college, on what kinds of change it induces. For example, if a college admits students with relatively primitive tastes, shallow interests, values unmodified since childhood and rigid patterns of thinking, and if after four years it turns out students who are flexible, imaginative, discriminating and capable of self expression, the college is undoubtedly a success. It would be a success even if none of its teachers were ever heard of outside of its own locality and the level of its accomplishment of its students at the time of graduation were not so high as that found in better known institutions.

"In our society, intellectual and scholarly work tends almost always to be individual and competitive, at least during the earlier training stages. We have rarely found ways to put the social needs of young people into the service of worthy scholarly endeavor. ...Today, young people seem to be naturally group oriented and given to cooperative enterprises, especially if they feel that they, as opposed to elders, are running things. Can we not help them to organize their social needs in the interests of intellectual and cultural aims?

"It is because of their greater repertory of routine responses that students and adults do not change as readily as children. The dynamics of change, however, are essentially the same in all three groups, and if appropriate stimuli are applied, students and adults will change. We need not wait for them to 'grow naturally' under conditions of comfort or protection. (We would wait a long time, according to the present formulation.) Nor should we suppose that once people have become 'mature' no more developmental change is possible.

"To ask a college teacher to be aware of the changing needs of the students, and to be on hand to meet the needs of particular students is, of course, to ask a great deal. That is individual education, the sort that ordinarily is found only at a few expensive colleges. Yet we need not be discouraged about the possibility of realizing some of the benefits of that system in large institutions. For one thing, increasing knowledge of personality development in students and the meaning of student-faculty relationships may become increasingly a part of faculty cultures so that it may influence the day-to-day behavior of a faculty member. Much will depend on our ability to produce literature about students that is sufficiently interesting and well written that the faculty member can

ignore it only with difficulty....It is well to remember too that most undergraduates are not looking for intimate relations with faculty. Many, including some of the best ones, have guilt feelings that they fear will be found out. We are not likely to be overwhelmed by students in need of intimacy. There is no call for us to have relationships of equality and good fellowship with students, and there is little to be gained from our seeking students out to meet our needs."

PRINCIPLES OF LEARNING AND TEACHING

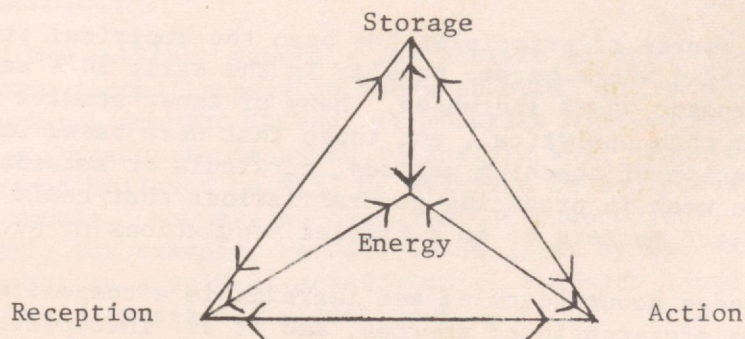
R. Stewart Jones
College of Education
University of Illinois

Introduction

Developing models of human behavior and theories about how behavior forms and is learned involves one in complex variables that are difficult to measure and hard to control experimentally. Human behavior is a composite of many classes of variables such as genetic makeup, previous experience, constitutional and physiological factors, all of which can only be approximated and none of which can be controlled in the ordinary experimental sense. To further complicate matters there are value judgments that help to determine the significance of the covariant factors involved in behavior. For instance, when one attempts to determine the factors associated with good teaching, he immediately confronts the problem of the criteria of good teaching. While criterion problems face all of us in the practical arts (in your field, e.g., what is a good ice cream) they are particularly difficult in matters where human values are involved.

There are numerous models or theories then about behavior. They include very mechanistic ones that view behavior as a result of stimulus-response connections, others that liken the human brain to a "thinking machine" like a high speed computer, and still others that postulate constructs such as cognitive processes, the unconscious, and conscience.

May I suggest for our purposes at this conference that we consider as major variables the following:



In this diagram I have attempted to show the four variables, reception, storage, action, and energy, as existing in a dynamic relationship with

each other, each affecting all others. The effects may operate in either direction, e.g., reception affects action but for every action (output) there is a reception produced by that action. Likewise, energy level (level of arousal) affects the intensity and quality of reception, but reception or input will determine to some extent the arousal level. In this system, no one element can be changed without a consequent change in all other elements. Some of the changes are transitory, e.g., caffeine may lower thresholds of reception and action, but the effects are only temporary. Other changes may be relatively permanent in that they become stored and available for future situations. These permanent changes may be nothing more than one item of information (as when we place one figure into the storage of a computer) or they may be experiences that change the operation of the system itself. An example would be learning a new method of solving problems.

The Origin of Principles

Principles of teaching and learning in the first part of this century were derived largely through philosophical and introspective analyses. Thorndike's "laws of learning" in his first textbook in educational psychology were almost parallel with the laws of association propounded by the British School of Associationism, and even as recently as 1946 one of the most prominent introductory texts in psychology listed the same "laws" of learning -- viz., primacy, recency, vividness, contrast, etc. Some of those notions are still with us and, indeed, have value in dealing with the teaching-learning process.

Shortly before World War I, Thorndike's own observations and experimentations led him to develop a new law of learning -- the "law of effect" which was the forerunner of our present concept of reinforcement in learning. At about the same time, I. P. Pavlov's conditioned reflex became the basis for much of modern learning theory. Subsequent events in the field of psychology followed from that experimental tradition. Unfortunately, many of the most accepted ideas about learning today, which have stemmed from that tradition, are derived from experimenting with animals, or from laboratories whose materials bear little resemblance to the meaningful verbal learning that we teach.

The third source of principles has been the empirical studies of classroom practice, which became popular in the early 20's and have continued and in recent years increased. Many of those studies were descriptive rather than analytical, and those that were based on experimental manipulation of teaching methods, curricula or materials of instructions were weak in producing generalizations that could be applied to various subject matters or to different populations of students.

Our knowledge about teaching and learning is a composite of information from the aforementioned sources, and it is incomplete and probably erroneous at times because we have not yet developed sufficient research in meaningful conceptual learning. But progress is being made, and there are some principles that may serve as good guides for college instructors.

Some Principles from Major Areas of Learning

I have selected for our discussion a few generalizations about learning and teaching from each of the following areas: the learner, perception, motivation, retention, transfer and application of learning, and problem solving.

A. The Learner

1. Aptitudes and abilities are subject to change and, moreover, may be masked by weaknesses in basic tool skills that may in some instances easily be rectified. Kinzer's work with World War II veterans who were failing chemistry revealed that simple remedial work in basic mathematics could make a significant difference in achievement in chemistry. In the same vein, Robinson's development of a Study Habits Laboratory where individual help could be given students on probation proved effective in reducing educational casualties.
2. Our conception now about abilities as related to ethnic and socio-economic factors has been seriously challenged by results obtained from truly individualized instruction. Learners given an opportunity to learn at their own level and rate and with materials geared to their existing abilities have been shown to make excellent progress. In fact, under newer modes of instruction, correlations between measured IQ and achievement scores have approached zero.
3. While some students suffer from an accumulative deficit in such basic psychological process as language development, it is encouraging that adults (even "deprived" ones) can learn. Unfortunately, the adults who might profit most from instruction are the ones most unlikely to avail themselves of it when it is offered. The problem is not one of aptitudes but the attitudes of the individual, and it is here that we must concentrate effort if we are to change abilities.

B. Perception

1. The quality, quantity and pattern of input into the mental system depend largely on the perceptual and mental set of the learner. One who intends to memorize will do so. One who intends to analyze or to be asked to analyze will tend to do so. If a student believes he will be examined on footnotes, he will read footnotes. Set may be conscious or unconscious. It may be induced, for example, by directions given by the teacher, or it may become a self-directed kind of approach based on past experience in similar situations.
2. Perception is an active process subject to deliberate control and training. Perceptual skills like the ability to scan

an X-ray film and pick out salient features may be enhanced by helping the student understand the processes involved in such activity and the conditions under which the process may go awry.

C. Motivation

1. One of the most powerful concepts in the psychology of learning is reinforcement, the strengthening and shaping of behavior by the strategic use of rewards. The learner who perceives his responses as instrumental in attaining a desired end will tend to remember and use those same responses in similar situations in the future. Reinforcement is playing a central role in such diverse matters as the development of automated instruction, altering deviate behavior in the classroom, building programs of remedial instruction and the treatment of the mentally ill.

2. Learning progresses more rapidly and efficiently when there is an immediate feedback that shows errors, their source, and provides the learner a knowledge of his progress. Most teachers are aware of this principle but most fail to make anywhere near optimal use of it in college instruction. The lag in returning exams is an example. So too is our final exam system whereby finals are rarely returned and discussed.

3. The learner who has a proprietary interest in the material to be studied, who is ego involved in it, will be more likely to learn and remember the material and more likely to incorporate it in his own action system. That fact was nicely illustrated during World War II in a study in which housewives who learned about the nutritional value of eating animal viscera did not change their buying habits, but when they engaged in discussions with others and tried to "sell" the idea themselves their buying habits then changed.

4. Learning occurs best under conditions of optimal (not maximum) arousal. Thus a student who is mildly anxious about his work in a course will probably do better than one who is highly anxious or one who is not at all concerned. Anxiety is but one of the conditions that produce necessary arousal for learning. Material that is of intrinsic value to students or that stimulates curiosity or appeals to other basic motivations of the learner may be learned well in the absence of anxiety.

D. Retention

1. Forgetting implies an active kind of interference that results from confusability among materials, consequently its rate is closely, but negatively, related to the clarity, and stability of the individual's present cognitive structure (conceptual systems) and his ability to discriminate among newly learned items and those already known. Retention is enhanced by materials that can be made more meaningful by linking them (showing how they fit or don't fit) with already existing concepts.

2. Concepts are best retained in conditions where the learning process makes possible some redundancy, and where the teaching agent (book, teacher, audio-visual aid) attacks the concept to be learned in a number of different ways. Studies of teachers in action reveal that heaviest reliance is placed on description as a method of presenting concepts and that many other techniques such as providing negative instances or using analogies are used relatively infrequently.

3. Retention is best when there is optimal distribution of practice and review, and when the units to be studied are inter-related into meaningful "wholes." Thus a strategic review immediately after learning and distribution of study and practice with occasional "breaks" should promote retention. Likewise review that helps to unite and relate separate elements of a course will increase retention.

E. Transfer and Application of Learning

Understanding, which is important for retention, is crucial for application and transfer of learning. Some of the conditions that seem to be related to both understanding and thereby better application are the following:

1. Learning and teaching that emphasizes relationships, principles and generalizations and intellectual processes,
2. Practice of newly learned material in a context similar to the one in which it is likely to be used later,
3. Opportunities for the student to discover principles and relationships on his own.

F. Problem Solving

Research in problem solving has given little that leads to generalizations that would be directly relevant to teaching. Some insights may be derived from studies that have analyzed errors in problem solving. Frequently cited errors include:

1. Negative mental set or "functional fixedness" where a person's frame of reference points him toward a solution or a process that is inappropriate.
2. Failure to understand the requirements of the problem, e.g., failure to read the specifications carefully.
3. Lack of factual knowledge or any notion of how or where to obtain it.
4. Lack of procedural knowledge. Facts are present but the person does not know how to use them.

Plenary Discussion with Consultants

(Jones and Owens)

Would you differentiate between repetition and redundancy?

Repetition is repeating for added emphasis and redundancy is re-stating in another way when it is unnecessary.

Do many students review their mistakes after an examination has been graded and returned?

Surveys have shown that very few students do, possibly because of the delay necessary for grading.

How can tests be used in teaching?

Tests are normally thought of as a tool for grading or evaluating student achievement. Students enter examinations with anxiety even when no grade is being given. That limits their value as a tool for teaching.

Do you retest material that students have answered poorly on later hour examinations or on the final examination?

Generally only on the final examination, since in a University material progresses rapidly and repeat questions are frequently inappropriate.

In your course in "Motivation" why did you give a semester final grade of B to each student and not an A?

The grade B is an acceptable grade for graduate students, and I believe that I was better able to evaluate student response when they were not receiving a maximum grade.

Of what importance are grades?

They have been found to be of only limited value in surveys of student performance after graduation. In defense of grading, instructors must evaluate student ability and performance for job recommendation, graduate school, etc.

How can a professor get "feedback" from students in a large class?

That is difficult in a large class. One important way is to return examinations the next class period. To do that you must give examinations that can be graded quickly. Consider giving shorter examinations more frequently using a combination of essay and objective questions.

How closely correlated are student "modivation" and student "arousal"?

Students never lack modivation, but they may not have the type we wish. When we arouse a student in class, we are changing his motivation.

Don't our present practices of lecturing and examination reward students for repeating our ideas? Isn't that harmful for retention of information?

Yes. That may be a major reason for the poor correlation between college grades and student success after graduation.

How can teachers help students who do work incorrectly?

Students are frequently modivated by giving partial credit for proper procedure. Those accustomed to low grades are generally not modivated by failure.

How can we use reinforcement to help a student?

When pleased by a student's term paper or answer to an examination question, don't just write "good" on it but make specific comments.

Doesn't the term "reinforcement" indicate a need for smaller classes in the freshman and sophomore years?

Feedback to students can be accomplished in large classes, but it is more difficult. Possibly class sizes should be reduced for freshman.

What class size would be optimum for freshman classes in agriculture?

I'm not sure. Instructors in freshman classes frequently don't use feedback to students, so smaller classes would have only limited value.

How important are physical facilities for good teaching?

Important, yes, but commonly over emphasized and frequently used as an excuse for poor quality instruction.

Recorded by: William J. Carpenter
Horticulture-Forestry



Small groups of participants continue discussions during between-session breaks

TEACHING OBJECTIVES

Richard E. Owens
College of Education
Kansas State University

Introduction

If I offered to sell you a house for \$20,000, and I claimed it was in good condition but would not let you look through it; would you buy it? In a sense the teacher and student may be in a similar situation. A student agrees to pay both money and effort for skills and knowledge. But he is often expected to pay for something that is never defined or described to him. He is expected to expend his efforts without knowing what he is getting for that effort. What I am saying is that if an instructor does not specify his objectives and does not describe how the student will gain from the instruction, he is certainly taking advantage of the students and may be setting the scene for a poor learning situation.

Therefore, one of the first questions you must ask yourself in teaching any course is, "What are the objectives of this particular course?" Until you can answer that question, you cannot realistically determine what teaching techniques to use, what content should be included, what type of classroom organization would be best, what tests or evaluation instruments should be used, what text would be best, what types of assignments to make, or how grades will be determined in the course. It makes a difference whether you as the instructor believe that your students should "really understand" or if you would be satisfied with the fact that your students "grasp the idea involved." It also makes a difference whether you want your students to know a great number of facts or whether you are more interested in their learning of ideas, concepts, principles, and relationships. In other words, before you start in any course you must first determine the goals you intend to reach at the end of the course or program. You as the instructor must know just what you want your students to be able to do at the end of the instruction.

It must be understood that the objectives do not have to be formal and stilted, nor do they have to be something the instructor does alone, nor do they need to be inflexible and hard-and-fast rules. In many cases they may not even appear in writing, but are conveyed verbally to the class members. However, due to the importance of well thought through objectives in the subsequent class procedures, course content, methods, and evaluation techniques, considerable attention should be given to objectives and how they affect the teaching and learning processes.

Steps Toward Building Objectives

McKeachie¹ has suggested some criteria that could be used to assist an instructor in setting up objectives for an individual course.

1. The over-all objectives of the college and the place of the course in the total curriculum.
2. The role of the college student and the relationship his role holds to the aims of higher education.
3. The student's status, needs, and expectations. They greatly affect what the objectives should be.
4. The function of the course in the eyes of the profession influences specific objectives.
5. The attitude with which students approach the course may have a definite influence on the objectives needed.

McKeachie and many others further suggest that objectives should be established as a continuous, cooperative effort that involves the students. Students cannot and should not be held responsible for establishing what and how they are taught, but they may be able to make a very significant contribution when given the opportunity.

Ways to Think of Objectives

Objectives may be thought of in several different ways. First, they may be in terms of curriculum or course content. My interpretation is that establishing objectives is one of the most serious problems of the typical school or class situation. We assume that merely taking a course will assure learning. The fact that the student has put in the required number of hours attending classes does not mean that he has gained much in the process. Learning is not an endurance test, although I am afraid that is all that it appears to be to some students in some classes.

Second, objectives may be in terms of the accumulation of knowledge. We place a great deal of stress on learning facts like names, dates, places, and other small bits and pieces of knowledge. I will show you later what the evidence is regarding retention of that kind of material.

Third, many people feel that the most important objective is in using abilities and processes. Here we would measure progress in terms of how well the learner was able to write, to calculate, to think critically or creatively, to solve problems. The emphasis then is a combination of accumulation of knowledge and its application to a real problem.

¹W. J. McKeachie, Teaching Tips (Ann Arbor, Michigan: The George Wahr Publishing Co., 1965), pp. 178-79.

Fourth, and most important if you look on learning as a change in behavior that comes as a result of experience, is that objectives should be in terms of behavioral change. You may be familiar with Bloom's Taxonomy of Educational Objectives. Bloom has categorized objectives in terms of three types of behavioral change expected in the learning situation. They include the cognitive, psychomotor, and affective domains. The cognitive processes include knowledge, understanding, awareness, comprehension, retention, and other mental processes. We normally think of the mind and the thinking processes when we are dealing with the cognitive domain. The psychomotor processes include skills and competencies in the physical activities of the learner. Such things as athletics, typing, and other physical dexterity activities fit into the psychomotor domain. The affective processes include attitudes, interests, opinions, prejudices, and values of the learner. It is the hardest domain to work with in the classroom and perhaps it is also the most important from many standpoints.

In keeping with the fact that objectives should be in behavioral terms, we also have to be sure that they were operationally defined. To be truly significant to the learning situation, objectives should say just what the student will do, that is, what actual activity will take place and what the learner will actually be expected to do; objectives should say just what processes will be used; that is, what type of thinking will be involved or what type of mathematical process will be used; and objectives should say what level of competence is expected; that is, what level of proficiency will be acceptable as evidence that the learning has taken place?

Robert F. Mager summarizes the suggested techniques for writing good objectives as:

1. A statement of instructional objectives is a collection of words or symbols describing one of your educational intents.
2. An objective will communicate your intents to the degree you have described what the learner will be DOING when demonstrating his achievement and how you will know when he is doing it.
3. To describe terminal behavior (what the learner will be DOING):
 - a. Identify and name the over-all behavior act.
 - b. Define the important conditions under which the behavior is to occur (givens and/or restrictions and limitations).
 - c. Define the criterion of acceptable performance.
4. Write separate statements for each objective; the more statements you have, the better chance you have of making clear your intent.

high school today will need to change occupations four to seven times in his life, even if he doesn't want to change. It has been predicted that 50% of the knowledge of today's engineering graduates will be obsolete in ten years. If the predictions are even close to correct, the student has a tremendous frustration in facing the future. It also is impossible for us to know just what we should teach for the future due to our rapidly changing world and occupational opportunities. Perhaps what we are teaching and placing high importance on will be outdated before the student gets a chance to use it.

We also must teach an entirely different level of education if we hope to prepare the learner for his future. His education must have adaptability. His total education may need to have a broader base than we have traditionally thought of in our college programs. He must be ready to accept and expect change rather than to be thinking in terms of a narrow speciality.

Education of the future must be thought of as a continuing process. Like a new car -- the initial investment is great. It is worth most when new, but it also depreciates rather rapidly and must periodically need some repair. We also must remember that the trade-in value depends both on the value of the original model and the way it has been maintained.

A new skill level will need to be approached in the future. This does not mean that we need to send everyone to graduate school, but it means we need to upgrade the quality of the program now being offered at the undergraduate level. The skill level of the past just is not sufficient for today, and it will be increasingly hard to compete in the future.

The Outcomes of Different Types of Learning

We must determine which types of learning are desired. We must decide whether we want students to learn facts, concepts, skills, attitudes, critical thinking, creative thinking, problem solving or what. There seems to be an hierarchy of learning outcomes in the cognitive domain going from the simplest to the most complex, abstract, and inclusive. The hierarchy progresses from preverbal percepts, which are acquired before language is developed, to factual information; to concepts, principles, and generalizations; to critical thinking, creative thinking, and problem solving. Beyond that, perhaps we have application and systematized knowledge.

There seems to be a great deal of difference in retention of different types of learning. Concepts are definitely retained better than facts. Another important finding is that methods of problem solving where the concepts, principles, and facts are used are retained better than the concepts, principles, and facts themselves. Perhaps the statement that, "If I give you a thought, it soon will be forgotten; but if I can encourage you to think a thought, I have accomplished something," is truly appropriate here.

Some of the implications from research about teaching certain types of material are very revealing. Greene³ found in college teaching of zoology, chemistry, and psychology, there was a loss of information of 50% in the first four months and 80-90% after twenty months. The material was of the general information nature.

Tyler⁴ gave a single test in zoology at the beginning of the year, at the end of the year, and fifteen months later. The percentage of gain or loss was shown in relationship of change in the fifteen months compared with the initial gain. He found a 22% loss in identification of organs from pictures, a 72% loss in recognition of technical terms, an 80% loss in recall of detailed information, no change in the application of principles, and a gain of 126% on interpretation of new experiments.

Wert⁵ gave zoology tests using the same method as Tyler but with three years between the end of the course and the follow-up test. He found a 50% loss in meaning of terminology, function of structure, and identification of main ideas, an 80% loss in matching names to structures, a 20% gain in interpretation of new experiments, and a 60% gain in application of principles to new situations.

The above indicate that facts, names, formulas, terminology and detailed kinds of information are forgotten quickly (sometimes 50% loss in one year), and that abilities requiring application of knowledge have a relatively high degree of permanence. Some learnings even show gains, especially when higher mental processes are involved such as: application of principles, drawing inferences, and interpreting information.

Conclusion

It seems possible that an instructor may function in a fog of his own making until he determines just what he wants his students to be able to do at the end of his instruction. It is important that the major objectives of the course or unit of instruction be clearly defined and specified if time and effort are not to be wasted.

Three major areas of concern will contribute to a realistic and sensible guided plan of attack. First, objectives must reflect the experience and careful consideration of the instructor. His contribution will reflect personal, as well as college objectives, professional influence, and the specific place of the course in the total sequence.

³E. B. Greene, "The Retention of Information Learned in College Courses," Journal of Educational Research, 24 (1931), 262-273.

⁴R. W. Tyler, "Permanence of Learning", Journal of Higher Education, 4 (1933), 203, 204.

⁵J. E. Wert, "Twin Assumptions", Journal of Higher Education, 8 (1937), 126-140.

Second, objectives must be made with due consideration to the information available about the students. Not only does that include such external knowledge as present level of development and problems they are expected to encounter, but also their needs, aspirations, and interests. Third, objectives must consider the nature of the subject matter. The type of learning expected to take place has a great deal of influence in the type of objectives that are appropriate.

Of great concern is the further consideration that educational objectives must be related to the psychology of learning. The instructor must be able to determine whether the objectives are feasible within the time available and with the background the students bring with them. It is also important to determine the sequence of learning and the interrelationships of the various objectives and the learning they involve.

The instructor must consider the uncertainty of the future and the ever changing needs of his students due to technological progress. He must also keep in mind variation in the intention of the various types of learning activities. All those factors have a real bearing on setting up realistic objectives for any course.

Plenary Discussion with Consultants

(Jones and Owens)

Are tests available to determine student motivation in various subject areas?

I don't know of any such tests.

Does a correlation exist between college grade point average and success after graduation?

No. Studies have shown a better correlation between student motivation and success. Students combining good scholarship with extra-curricular activities have achieved greatest success.

Are tests available to measure student creativity?

Yes, these are used widely in industry. They give a good measure of ability to develop fresh ideas and new products. Educators are frequently criticized for suppressing creativity. Today's greatest need is for people capable of finding areas where change is necessary.

You previously said that a goal set for students must be attainable. Do new teachers set higher goals than experienced teachers?

Yes. Recent Ph.D.'s usually try to "cram" all they know into a semester or year. Experienced teachers usually set more realistic goals and proceed more slowly.

Is a picture worth a 1000 words in teaching?

Under certain conditions a picture or pictures have great advantage since much can be learned and understood quickly and a picture can be reused. For example, if you wish to instruct in how to skin an animal, pictures show that which would be hard to describe and they could be reused many times without killing additional animals.

Should note-taking be encouraged since it detracts from the thought being expressed by the teacher?

True, but for new material not found in other places note-taking is an essential aid in learning and long term retention.

Should we teach primarily the "whys" rather than the "hows" in agriculture?

That is a problem in any applied field. A balance is needed; there is a trend now to add more applied material. Theory is important but students frequently don't fully understand it until some application can be shown. Students can't store unrelated principles and expect them to be there when application is needed. We in education are re-examining our views regarding vocational learning.

Would you comment on the use of T.V. in instruction?

Several Big 10 universities have been studying use of T.V. for instruction at their branch colleges. First results indicated that students didn't learn so well, but their learning has improved as the professors have used modified teaching techniques. More study is needed to improve the method of teaching before it can be widely accepted.

What do you think of having all honors students housed in one dormitory?

I don't like it because such students have a tendency to be very individualistic and more will be gained by mixing them in dormitories with other students.

Recorded by: William J. Carpenter
Hort.--Forestry



Group discussions encouraged lively exchange of ideas. This group was chaired by Earl Hansing, upper left, with pencil.

DISCUSSION GROUP I

Keith Huston, Discussion Leader

Howard Bradley, Recorder

From the twelve suggested topics, discussion group I chose Advising. The following questions were asked:

1. What is involved in advising students?
 2. What is the approximate number of students advised?
 3. How does a student arrange for advisement?
 4. Is advisement included when accounting for faculty load?
1. What is involved in advising students?

It was agreed that the individual student is of utmost concern, that faculty members should try to know the student on more than an academic basis within the limits of the number of students assigned for advisement plus the teaching/research load. Opinion differed on the extent and direction an advisor should take. Some thought that advice concerning curriculum requirements was sufficient while others felt that students needed more personalized advice. In some curricula as many as two thirds of the seniors are married and asking for advice beyond course requirements.

2. What is the approximate number of students assigned for advisement?

The number of students assigned to a given faculty advisor ranged from six to forty. This was accounted for by the variance in departmental enrollments but it was generally agreed that any number beyond twenty places an undue burden on the advisor yet does not preclude effectiveness of certain individual staff members.

3. How does a student arrange for advisement?

An "open-door" policy whereby students are free to drop in for conversations concerning their achievement was deemed highly desirable but in many instances impractical because of teaching/research responsibilities. Suggested alternatives were to post hours during the week when the advisor would be available for consultation, to advise indirectly through class discussions, and to use graduate students for non-academic advisement.

Most advisors expect students to initiate the contact but some said that as soon as an advisor became aware that an advisee was in academic difficulty, the advisor should be the one to initiate a conference.

4. Is advisement included when accounting for faculty load?

There was a general understanding that one tenth of the faculty load should be given to student advisement. Where many students are assigned to an advisor, more than one tenth time is needed for desirable advisement.

After discussing the mechanics of how and when advisement was to take place, the group concluded that the principle task of the advisor is to help the student experience success in some aspect of his university program.

DISCUSSION GROUP II

Walter Smith, Discussion Leader

Hugh Thompson, Recorder

One member of the group wanted to know the status of Pass-Fail grading system, and a few minutes were taken to explain its status.

It was generally agreed that one of the most important roles of a faculty member is that of student adviser. A number of factors make it a most difficult job. Some difficulties are created by lack of information on a student's background and failure of student to understand and fully participate in the relationship.

The first point raised was the difference in the role played by the counselor and the adviser. There seemed to be some feeling that counselors resent an adviser working beyond the rather small area of curriculums and courses. There needs to be more knowledge and understanding between counselor and adviser. As a start, we tried, with little success, to define the role each should play in the student's career. The best definition we could formulate was:

1. A counselor gives tests such as ACT or occupational aptitude and has the capability for professional consultation;
2. An adviser helps a student select a curriculum and courses within that curriculum.

The adviser's role is made more difficult by the great amount of work advising adds to an already busy schedule. The average adviser has 30 or more advisees, which could mean 30 contact hours each week but usually doesn't. There is a feeling that administrators do not recognize the work and responsibility involved.

It was felt we should look at the relationship from both the adviser's and the advisee's point of view, even though the latter is somewhat hard to understand. First, there is the fear of voluntarily seeking out someone in authority. When he does go to his adviser, a student expects directions rather than advice. Second, a student frequently

is overoptimistic about his grade status or his ability to recover from a low grade. As a result, the adviser does not know when a student is in trouble until it is almost too late to take effective action. Advisers do not inform their advisees often enough that a new student can withdraw from a class as late as the ninth week without recording a failing grade.

Even though we know that a certain percentage of entering students will not complete college, we must work on the premise that each advisee has that capability. The adviser must devise methods to meet more frequently with his advisees. Group meetings may be a start, but each student must develop a feeling of personal relationship with his adviser. An adviser should involve his advisees in other activities of interest such as club meetings. He should present a sympathetic ear to personal problems. He should convince a student that a visit to the counseling center is not a sign of social stigma. He should pay particular attention to advisee's study habits.

Even though an adviser does his best to keep a student working at a satisfactory level, it becomes obvious quite early that a particular student will not satisfactorily complete the requirements for a degree. In that case, the adviser can see that some of the requirements on sequences and curriculums are waived to allow the student to take a few courses that are of interest and may have direct bearing on his intended vocation. i.e. Some girls enroll as animal husbandry majors even though only 1 girl has completed the requirements for a B.S. in that major during the past 20 years. Students from other curriculums apply to enroll in certain courses without any desire to take the whole curriculum. That should be done under special circumstances.

Finally, we posed a number of questions that we were unable to answer that could be solved with more information and a more general discussion.

1. Is there anything available in the new vocational schools for students wanting training in agricultural subjects but who are unable to get into or complete a college education? (It was brought out in the general discussion of the entire group that some of the vocational schools offer courses in farm mechanization, fertilizers and fertilizing.)
2. Does an entering freshman know his ACT score and what it means?
3. Are entering freshmen mature enough for college? All advisers indicated that they had difficulty interpreting transcripts from junior colleges and two-year curriculums.

DISCUSSION GROUP III

Elmer Heyne, Discussion Leader

Ben E. Brent, Recorder

Examinations

I. General

Examinations were seen as falling into four categories:

1. Proficiency
2. Instructive
3. Measuring
4. Aptitude

The proficiency-type examination might be classified like an examination over the multiplication tables. In other words, students repeat the examination until some high degree of proficiency is obtained. The instructive examination is one used as a teaching tool. The measuring examination is generally used for grading purposes. Aptitude tests include I.Q. test. It was pointed out that the instructive and measuring examinations can and should be combined. Any test should be a teaching tool.

II. Essay Exams

The essay examination was seen not only as a test over factual material, but also as an exercise in self expression. For that reason it sometimes is difficult to evaluate. Spelling, penmanship, organization, and general facility with the English language are many times evaluated along with the answer. It was the consensus of the group that university students should be held responsible for a reasonable level of writing proficiency.

III. Oral Examinations

The oral examination was seen by the group as quite useful under several conditions. "Make up" exams were often given orally. One member of the group mentioned that he had used the oral examination with foreign students whose writing ability was rather limited.

IV. Immediate Feedback

The advantages of the immediate feedback were discussed and it was concluded that where possible, answers to examinations should be

posted outside the door of the examination room. Immediate feedback would seem to be a great advantage of oral examinations.

V. Grading and the Pass-fail System

The pass-fail system was seen as quite useful for students who might wish to expand their background through taking course work in fields widely divergent from their own. One of the "excuses" for retaining the classical letter grade system seems to be to evaluate Graduate School applicants. University grades and later success seem to be quite poorly related.

VI. Examination Frequency

The group noted that frequent examinations were desirable in order to use examinations as a teaching tool. Weekly examinations, where possible, were favored. The "shot gun," both as a teaching and a measurement tool, was almost universally condemned.

VII. Cheating

To protect the honest, conscientious student, it was deemed the responsibility of the instructor to prevent cheating when possible. Various techniques were discussed, one of the most useful seemed to be giving two examinations with the same questions in different order. Cheating appeared more prevalent in freshman and sophomore courses than in upper level courses. Prevention of cheating in overcrowded classrooms was, according to several members of the group, almost impossible.

DISCUSSION GROUP IV

John McCoy, Discussion Leader

David Mugler, Recorder

Examinations

This group felt that examinations served three useful functions:

1. In the overall learning process,
2. In evaluating students,
3. In evaluating the instructor.

The following items relating to the examination process were discussed with the general consensus of the group indicated:

An examination should be composed of a variety of both objective and subjective type questions. The questions should be clear and unambiguous.

Most students seem to prefer more short exams given often.

Old exam papers should be made available and should be posted in a location accessible to all. That would tend to equalize opportunities for all students. The danger of students studying only old test material was recognized. Subject material should be reviewed before the examination.

Cheating on examinations was recognized as a problem in administering exams. Caution should be taken to prevent disrupting the entire class. Quietly asking the student involved to move is recommended. The instructor has an additional responsibility in preparing an exam, as poorly organized and/or administered exams may induce cheating.

Taking English, spelling and legibility into consideration was discussed. Students should be made aware of their errors. A suggestion of having the student locate such errors on his paper was made.

If extra work is permitted to raise grades, all students should be given an equal opportunity to do extra work.

Giving exams early in the week tends to decrease the number of students requiring make-ups.

A period near the end of the semester for making up exams seems to be a good practice.

Answers to exams should be posted immediately after the examination period.

Exams should be returned as soon as possible.

It was learned in a subsequent discussion that assistance in preparing exams is available from Dr. Owens and other personnel in the College of Education.

DISCUSSION GROUP V

Hyde Jacobs, Discussion Leader

Warren Prawl, Recorder

Group V selected examinations for discussion.

Class Size and Personal Acquaintance

Several of the group were making the transition from small to large classes. Accordingly contacts with students as individuals become less frequent and less personal. Supervision, guidance and counseling therefore suffer. Smaller classes are preferred but it was reported that the amount of learning that takes place is not necessarily influenced by class size.

Dr. Hall noted that the ten top teachers in the College of Agriculture, as rated by students in the past, all had ten or fewer students in their classes. Discussions occur in large classes but individual contributions and reactions are reduced. Class size also influences the type and length of examinations.

Class Size and Teacher Assignment

Individual traits and abilities of teachers should always be considered when class assignments are made. That becomes increasingly important as class size increases.

Administrators always should assign their best teachers to large classes. Teaching assistants should be provided for large classes. Discussions indicated that assistants should be provided when class size approaches 50. Normally it takes one or two semesters for an instructor to feel comfortable after the transition from small to large classes.

Constructing Tests

Discussion centered around the essay (subjective) versus the objective test. It was noted that some essay tests are really objective tests in that they require set responses to questions. In other words freedom of expression is not allowed.

Dr. Elzinga reported on the procedure followed by the Division of Biology in constructing tests for large lecture classes taught by several teachers. All teachers involved prepare questions, then meet as a group to review, delete and refine questions. The test is turned over to an editorial group for suggested improvement. Then two faculty members take the test. Final corrections are then made before the test is administered to the students. Such a procedure removes ambiguous questions and provides a more ordered, logical set of questions. Approximately 500 students are examined. Exams are scored the evening the test is given and papers returned the following lecture where discussion takes place.

Design of multiple choice and of true and false questions was discussed. Most felt such questions were difficult to prepare. Some stated they did not use such questions. Dr. Owens said both can be valid and reliable questions.

He suggested that two or three test questions be prepared after each lecture. The accumulated questions could then be culled and edited when exams are prepared. Dr. Morill asks students to prepare questions and provide answers. This process causes the student to review his material and gives the teacher new ideas for questions. Better questions are sometimes selected and included in the exam. Dr. Hall uses an overhead projector for short quizzes and to present identification sections of examinations such as plant and part identification.

Essay questions take valuable time of both students and teachers. Questions of priority that such tests cause must be determined by the individual teacher. Real life situation questions are useful, especially when they are closely identified with the subject matter presented. Situation questions can also be developed into objective questions. Many essay questions are poorly worded. It may take up to 20 minutes to prepare a good question but time spent in preparation pays off in time saved in grading.

Dr. Owens has written a brochure, which is available, on the preparation of tests.

Uses of Tests

Two primary uses of tests are (1) for student evaluation and grading and (2) as a teaching tool.

There are several other uses. One is to determine general level of proficiency of an individual or a class. That can be done by giving a general exam the first day of class. Dr. Sjo sometimes uses his initial exam as a final exam with students correcting or justifying answers they gave on the initial exam. Including essay questions in an exam helps students organize and express themselves. Some teachers use oral exams to test subject matter, organization, grammar and expression. The problem with oral exams is that they are difficult to score, are too much like judging. Some use exams to help students improve grammar, penmanship, spelling, logic, brevity, and organization.

Cheating on Exams

Several members said that cheating does not seem to be a serious problem at Kansas State University. Dr. Owens concurred but still urged teachers to exercise caution in seating arrangements for exams.

Dr. Owens indicated it was practically impossible to construct two different but comparable exams over identical subject matter. To combat possible cheating questions can be renumbered and shuffled from page to page.

Grading Examinations

Many in the group stated that grading was their biggest problem. Grading is tedious and time consuming. Many teachers give objective exams for convenience even though they prefer essay type exams. It is also more difficult to assign values to essay questions. Many give a combination objective - subjective test as an expediency.

Some teachers require that mistakes in punctuation and spelling be corrected before a grade is assigned. Others insist that organization, grammar and penmanship be improved before marks are recorded as final. Others give credit for neat concise papers.

Recommendations

Although no formal recommendation was made, it was the consensus of the group that an office of instructional resources should be established under the Vice President for Academic Affairs. Such a resource would be an aid to effective college teaching.

The group recommended that the committee for effective instruction of the College of Agriculture request the College of Education to provide a seminar or seminars on the design and use of tests. Dr. Owens indicated his willingness to cooperate in such a venture.

DISCUSSION GROUP VI

Earl Hansing, Discussion Leader

Harold J. Tuma, Recorder

The group at the outset was somewhat confused as to the roll of the pass-fail system in our current educational programs, however, certainly felt that it has a place and could be used profitably. It was also the general opinion of the group that marginal students would favor the pass-fail system and that the better students would prefer receiving a grade. The question was raised, is the pass-fail system the mark of university growth?

The merits of this system were discussed and will be listed as follows:

1. If properly used, the pass-fail system would allow students to move outside their major area of interest so that they might achieve a more well-rounded education. To further clarify this, there are courses that would tend to make a student a better citizen or more proficient in his work; however, some students fail to include these in their program because of a lack of background to make a good grade. Courses such as logic, physics, calculus and even photography and flower arranging might fit into this area. This would allow the student to take the course for his interest rather than for the grade.
2. Some of the more advanced courses, or short-course type subject, might use this system so that students could spend more time in areas of their personal interests rather than worrying about studying the material which the professor might test them on to base the grade for the course.

The group also recognized some problem areas which might merit further study. The handling of grades and grade points, second, the lack of uniformity in setting up the pass-fail standards. Third, graduate programs might be rather difficult to evaluate if certain courses or too great a number of courses were to carry the pass-fail status.

The group also expressed its views by a vote either favoring or disapproving the various ways in which the pass-fail system might be used:

1. It was felt that the pass-fail system should not be used for courses in the major field of study.
2. The pass-fail system was favored for electives that might be used outside the major field such as in the humanities, behavioral science electives, and in all seminars.
3. Most of the group felt that both the student and the professor should have the option of whether his course would be based on the pass-fail or regular grade system.
4. Most of the members of the group also felt that no limits to the number of pass-fail courses per semester should be set. This was based on the stipulation that as long as they stay within the limit as to the courses previously stated in item No. 2.
5. Most of the committee felt that fail in the pass-fail system should be anything below a D as it is currently being used.
6. Ag. in Our Society was discussed and the conclusion drawn that the pass-fail system would work in very nicely for this particular course.

The pass-fail system, as far as a graduate program was discussed. The majority of the committee felt that a passing grade under the pass-fail system would be equivalent to a "B" or better in the current grading system and that a "C" or below would be a fail. Thesis credits for the masters and Ph.D. degrees and graduate seminars were unanimously approved as courses which could easily be used in the pass-fail system.

Short courses were also briefly discussed with the idea finally being unanimously expressed that it would be optional to the student and professor as to whether the pass-fail or regular system of grading would be used.

THE TEACHER IN ACTION: TRANSLATING CONCEPTS INTO REALITY

Richard E. Owens
College of Education
Kansas State University

Introduction

We have been looking at the principles undergirding the learning-teaching process and the objectives of instruction; now, let us take a closer look at just what this means to the teacher in action. Let's actually translate the principles and concepts into reality. You will notice that I refer to the learning-teaching process rather than the teaching-learning process. I believe the emphasis is better placed when we put the learning first. Some would say that really there is no teaching; there is only learning. Whatever you believe, it is evident by your presence at this conference that you are concerned about the learning process and how we might improve it in our classrooms.

Variables Affecting Efficiency of Learning in a Group Situation¹

There are a number of variables that influence the learning that takes place in a group situation. As in any cause-and-effect relationship, it may be very difficult to determine just which factor is actually the one causing the problem; but it is reasonably certain that at some time each of the factors has its part in making or breaking the situation. It also may be that the interaction of two or more of the factors is the actual cause, and that is simply not possible to identify the course. With that dilemma in mind, let's look at some of the variables that influence the situation so much. First, there are learner characteristics. Each classroom group is made up of individuals. This may sound trite; but we have to keep reminding ourselves that we are not dealing with groups and averages, per se, but with individuals who make up groups and give us averages. Within the groups we find individuals who have their own abilities, aptitudes, interests, needs, values, problems, goals, levels of aspiration, etc. Therefore, what applies to one group does not apply to another; likewise, what applies to one individual in the group does not apply to another individual in the group.

The second variable that we should look at is the teacher's characteristics. Just as every learner is a different individual, so is every teacher a different teacher. He, too, has his own abilities, aptitudes, interests, needs, values, problems, goals and objectives,

¹For a more complete treatment see H. J. Klausmeier and William Goodwin, Learning and Human Abilities (New York, Harper and Row, 1966).

level of aspiration, etc. Therefore, his style of presentation may or may not be the same and it may or may not be as effective as someone else's. His personal characteristics have a great influence on the approach he should use in the classroom. The difference that each teacher has makes it very difficult for an outsider to evaluate each individual's teaching without considerable exposure to the unique methods and style being used.

The third variable -- and to me, the most important of all -- is the interaction between the learner and the teacher. There is a magic that transpires between a learner and an enthusiastic, sincere teacher. Not only does the student react to the enthusiasm of the teacher, but the teacher reacts to the enthusiasm and interest of his students. The interaction, then, is a two-way process; each influencing the other. That is why I am not worried that any form of autoinstruction will ever replace me in the classroom. I see no reason to fear that a mechanical device like a computer will ever be able to take the place of a good teacher. For the purposes of individualizing instruction, supplementing the regular curriculum, or reinforcing remedial skills, the techniques of programmed instruction have great potential, however.

A fourth variable that influences the efficiency of learning in groups is the subject matter itself. There is no question that the type of learning to be done is a great determiner of necessary approach and style in teaching. That would have special significance in the agricultural curricula with their broad range of subject matter. Certainly, if teaching zoology is the same as how to judge a beef carcass, there is likelihood that one or the other will not be well done.

Another factor that has never ceased to amaze teachers is the tremendous difference between two consecutive classes in the same subject. Even though the students appear to have about the same average and range of individual characteristics (although this is never completely so), and the same teacher does the teaching, and the material covered is the same, there are still differences to be reckoned with. It is unbelievable just how much one or two personalities within a group seem to influence the over-all actions of the group. The structure of any group is very complex and involved and often defies analysis when broken down into its components. Yet, it is there and it must be accepted and considered as an integral part of the learning situation.

Outside forces make up the sixth set of variables that affect the learning-teaching situation. Here too, we see superimposed on the already complex situation characteristics that encourage or impede learning. The intellectual atmosphere provided by the administration, the reputation of the college, the esteem of the teaching faculty, and the over-all attitudinal patterns of the students are but a few of the factors that might influence this area.

Last, but not least, are the physical characteristics of the classroom. Even though good teaching can, and often does, take place in

rather barren surroundings; it is a definite advantage to the teacher and the learner to have good facilities. To some learning situations the physical characteristics would play a vital role in the total learning situation. That would be true in several teaching situations in agriculture.

Again let me stress that each of the variables contributes to the success or failure of the learning-teaching situation; but the relationship of the variables to one another forms a very complex interaction pattern that would be difficult, or perhaps impossible, to analyze.

The Teacher's Role in Purposeful Learning

Klausmeier and Goodwin² describe the teacher's role in purposeful learning under ten instructional processes. They see teachers as instructional aids to learners. The teacher's processes simply assist the learner in his efforts as he attacks the learning situation. One of the first things the teacher does is to help the student by clarifying the objectives of the learning situation. That, in turn, helps the student set realistic goals. If the objectives are operationally defined, as discussed previously, the basis for the learning situation is set.

It is also the teacher's responsibility to motivate the students. Although the ultimate and most important motivation comes from within the student himself, the teacher can do much to focus a student's inner motivation. In many types of learning, the teacher supplies a model for the student. It may be necessary, in many areas in which you teach, to demonstrate the proper performance of a task. Sometimes we use another student to do the demonstrating and that may prove to be even more effective than the teacher doing it himself. The model may also be a verbal one in the more academic situation.

It is the teacher who must decide on the sequence of presenting material. Too often we let the textbook determine the sequence, but if you know your material well enough to teach it, you will have definite ideas about the order of presentation. One should not blindly follow anyone else's guide unless it truly fits the situation.

The beginner usually needs help in the early stages of learning. Helping him make good initial trials may help him avoid having to unlearn incorrect responses. That is especially applicable to the psychomotor learning activities. Along with it comes the management of practice. As was pointed out earlier, the place of practice is very important in the learning process. Learning also is influenced by the kind and amount of practice.

We must provide for individual differences, or we may be doing a poor job for everyone. We may be going too slow for some students

²Ibid, pp. 60-70.

and too fast for others and yet not really meet the needs of the middle group. Speed certainly is not the only important factor, because we have evidence that the better students not only learn faster, but they tend to learn in different ways. Therefore, our assignments and instructional methods may need to vary for different groups within the over-all group.

The typical student is not too astute at evaluating his own performance and therefore may need help in this aspect of learning. Often it is the evaluation of the learning that has taken place that helps the learner set future goals. That, in turn, helps him better evaluate future progress. We already have discussed the need for teaching to promote better retention and the desirability of helping students apply the knowledge they have.

As was true with the variables affecting learning in groups, the other processes do not operate in isolation from each other either. It is often impossible, if even desirable, to try to separate them. Nor is there any particular order in which they should occur in any given learning situation. Yet, each has its part in the total learning situation.

Application of Generalizations and Principles

Now, let's take a closer look at some of the generalizations and principles discussed earlier. The problem approach has proved quite effective in many teaching situations. It also has been found that both critical thinking and problem solving techniques can help students become better learners. However, most learners do not become critical thinkers or good problem solvers without having instruction in how to more effectively use those techniques. So, we must teach such methods if we want the learner to be most efficient.

In the area of practice, we have discussed the value of proper placement in relation to the activity itself. We also know that most learners have trouble seeing how the small segments of learning fit together. Therefore, one purpose of practice is to help the student relate the whole to its parts and the parts to the whole situation. It has also been established that advanced organizers help. That means that we give the learner a context within which to relate the material rather than practicing in isolation. We also may use gimmicks or memory organizers to help, and although they have definite weaknesses; they may help one remember bits of information.

The distribution of practice becomes an important determiner of the efficiency of learning. In general, it is most effective to spend practice time in shorter sessions, distributed over time, than it is to use the same amount of practice time in one long session. Therefore, the typical student who crams for the examination the night before is not only studying at a poor time in the sequence, but he would be more efficient if he distributed the same amount of study time over several

days. Another mistake often made with practice is using it as synonymous with drill. Practice, to be really effective, should involve application and use in a variety of situations rather than rote repetition and drill.

As for motivation, I would like to add that even though they dislike the idea, most students seem to profit from the use of quizzes. They feel that it keeps them on their toes and forces them to distribute their study and practice time. Another important fact is that reward and punishment are not opposites. What appears to the teacher to be reinforcement or reward may, in actuality, be punishment to the learner. One's self-concept and personality determine how he interprets the reinforcing activity. There are many misconceptions about the contributions of competition and cooperation. Again, as with reinforcement, there is much individual difference in the effects to the individual learner. Actually, both contribute to the learning situation because, in the final analysis, the individual is the determiner of his fate.

Another very important consideration in the learning situation is the degree of active participation. In many areas that you teach, the amount of learning taking place may depend directly on the amount of personal involvement attained by the student. Therefore, look for ways that you can elicit personal involvement in each learning situation. One example that I have used is to give a demonstration but instruct the students that I will not say anything but yes or no. If they want to ask anything about the demonstration, they must structure their questions in such a way that the instructor can answer by a simple yes or no. Another way is to have several sets of equipment so that the students can follow along and simulate the exact situation as it progresses. That avoids the possibility of watching impassively and then not really understanding what has been done.

In the area of measurement, we should strive for self-evaluation. If the student can get to the point where he can evaluate his own efforts, then he can more realistically face new learning situations. I think that we must face the fact that the typical learner studies to do well on the tests. If we test facts, names, dates, etc., then that is what he will learn. If we test ideas, synthesis, and thinking; then, he will study to be able to do those things. What I am saying is that we determine how the student studies by our method of evaluation. If we want students to learn to think and use their knowledge, we must test in ways that encourage such study habits. Something else I have long advocated is to pre-test before starting a unit. We tend to decide what we want to teach, outline it, and present it whether the students need it or not. It would be much more realistic and valuable to pre-test before presenting the material. That way, the teacher can find out what the students already know and what they are very weak in. Then, the material that is really needed can be presented, with reviews over some material, and new material can be added to replace material students already understood.

How to Best Achieve the Learning Outcomes

There are times when we need to teach different types of learning. We have talked about facts being less well remembered than concepts, principles, and ideas; and yet, the fact remains that we do need to know certain bits and pieces to proceed to higher learning. Therefore, if we have to know facts, let's learn them in the very best possible way. There are principles for learning facts. The principles help make teaching and learning more efficient. Some of the principles of learning facts most effectively will follow, but first let's establish what we mean by facts. A fact is something that has happened, an event or an actual state of affairs. It is time oriented. For instance, I learned that there were 92 elements. And, at that time, there were. But today that is no longer an accepted fact. That is another reason it is dangerous to teach only facts. Briefly, here are some of the principles of learning facts effectively: (1) organize for the individuals involved (that is, make sure that it is appropriate learning for the group you have); (2) use advanced organizers (help them see the importance of the facts, relate the facts to past learning, and give students a context in which to understand the fact); (3) provide proper sequencing; and (4) arrange for the appropriate practice necessary to learn the particular information presented. Practice is especially valuable in factual learning and it is also most important that practice not be sheer rote repetition.

Concept learning is at a higher level than factual learning. Concepts are often inferences or associations that are formed of objects or events. So, in one way, they are the association of two or more facts. Factual learning is almost always a pre-requisite to concept learning. Some of the principles of learning concepts are:

- (1) encourage active participation;
- (2) emphasize the important aspects (the student seldom sees the most important parts on his own);
- (3) relate current learning to previous learning;
- (4) organize the sequence so students will learn the material in a logical manner;
- (5) use guided discovery (even if a student discovers nothing new, if what he discovers is new to him, great learning has occurred, so leave some open-end situations for the learner);
- (6) provide opportunity for the application of the conceptual material to realistic situations.

Skill learning fits into the psychomotor domain of learning. Although much school learning is in the cognitive domain, the agriculture

student perhaps uses his psychomotor abilities more than the average college student. Some principles for efficient learning of skills are:

- (1) analyze the skill in terms of the learner's abilities (not only is it important to know the skill well, but a blend with the learner's particular strengths and weakness will guide the situation);
- (2) demonstrate the correct response (nowhere in the learning situation is demonstration more important, and whether it is done by the teacher or another student, it is a vital part of skill learning);
- (3) guide the initial responses (this is most essential in skill learning because it is much easier to teach the skill from the start than it is to change bad habits);
- (4) arrange appropriate practice;
- (5) provide immediate knowledge of results (it is hard to analyze your own performance of a skill activity, so help is essential);
- (6) help correct inadequate responses.

As was pointed out earlier, attitudes are very important in the learning process. Teachers' attitudes are an entire area of Bloom's taxonomy, so they are a very vital aspect of the teacher's task. As you must know by now, I consider attitudes a very important part of the learning-teaching relationship. Some of the principles for good attitudinal teaching are:

- (1) provide good examples (students have little respect for a teacher who does not practice what he preaches);
- (2) accentuate the positive in the classroom (make sure that learning is a pleasant experience);
- (3) extend the exposure and information aspects (it helps to see both the good and bad and to actually experience the real situation as nearly as possible);
- (4) group activity is generally beneficial in establishing attitudes.

Creative or divergent thinking is very important in the learning process. That is where many of our great ideas originate - through the ideas coming from the creative thinking process. Terms often associated with creativity are: fluency, flexibility, elaboration, imagination, originality, and productivity. Business and industry are way

ahead of us in developing creative learning. Some of the principles of learning that help encourage creative thinking are:

- (1) encourage individuality (let them extend their own individual talents and abilities to the fullest);
- (2) encourage divergent and flexible production;
- (3) foster the creative personality;
- (4) provide opportunities for creativity; and
- (5) encourage originality in all thinking.

Problem solving is considered by many to be the most complex form of human behavior. It usually involves a problem or situation in which the learner does not have a ready solution. Perhaps if we truly produce good problem solvers, we will be preparing them to face the unknown future as well as we can. Some of the principles of good problem solving, learning are:

- (1) activate solvable problems (that means to keep in mind the level of the learner and make sure that the problem is realistic for him;
- (2) assist the student in working with the problem (here is where the learner profits most from the teacher's help because he may lack the proper skills of attacking difficult problems);
- (3) teach problem solving techniques rather than expecting the students to do such thinking naturally; and
- (4) encourage independent discovery and evaluation.

Summary

Efficient learning depends on many factors and any attempt to make it a simple task must fail, but there are many things that we can do to make learning more effective. Above all, methods must fit the learning situation and the teacher becomes a vital factor in their success or failure. It must also be remembered that what is ultimately learned depends on the student's interpretation of the situation. That may make it appear that the teacher has a hopeless task, but such is not the case. It does, however, make us realize the importance of considering the learner and his conception of the learning situation in everything we do. Finally, it seems to me that no matter what method is used, the teacher's sincere enthusiasm, techniques, and interest in the individual student are keys to successful learning.

Plenary Discussion with Consultants

(Jones and Owens)

Where can teachers get help in problem solving techniques?

The "Illinois Vocational Agriculture Teacher" magazine had a very informative article on that subject in a recent issue. I could provide you with some literature and references.

Are university courses and literature available to assist students in "how to study?"

There is no one course specifically oriented to the problem at K.S.U. We do have a freshman orientation booklet that should help and I could provide references for books and pamphlets in Farrell Library. Ohio State University has a study-habits course for students on probation, with a book published by the U.S. Air Force.

Where does the role of the adviser end and the counselor begin?

The student adviser must use his own judgment, but when symptoms become serious, send students to the counselor.

From the forms filled-out by entering freshman, what question bothers you the most?

High school grades - there are so many factors to be considered when they are being evaluated. Colleges and universities with selective enrollment depend so heavily on grades.

How important are the student ACT scores provided to advisers?

It is important that both the adviser and student know his strengths and weaknesses. Encourage students to enroll in courses in weak subject areas. Perhaps advisers should meet with each advisee and explain ACT scores.

Do low ACT scores prejudice an adviser toward an advisee?

The ACT scores of many students indicate less than a 50% chance of making over a 2.00 G.P. average. Increased enrollments at

state supported universities mean reduced student quality. Grading procedures at the universities have not changed over the years, so a student's chances of getting over a 2.00 grade point may not be very good when tests indicate weaknesses in certain subject areas. It is hoped that improved student advising at our universities will improve.

How can advisers assist students who lack proper background and ability to pass Chemistry I and Organic Chemistry?

Work with the professors teaching those courses and encourage that preparatory courses be established in chemistry to provide background information. Frequently students do better in those courses if their scheduled load is reduced the semester they take them. Too often advisers, parents, and Uncle Sam fail to appreciate that some students require more than four years to complete a college curriculum.

Should advisers recommend reduced course loads very often?

Frequently that can be avoided by following proper course sequences and insisting that all course prerequisites be met. Advisers should avoid scheduling several difficult courses in any one semester and should avoid too many laboratory courses in one semester. When a reduced course load seems advisable however, recommend it.

What should an adviser recommend when a former honor student is "flunking out?"

Frequently honor students coast through their freshman year and later find themselves in scholastic trouble. There are many possible causes, one is lack of motivation. Another is that the pressure of being a good student is too great. Some honor students have very poor study habits.

How much of the student failure in chemistry is due to attitude? Ability?

I don't know how much a poor attitude contributes to failure in chemistry, but both ability and accomplishment in high school and college mathematics seem to be the best predictors of success in chemistry.

Are college freshman sufficiently mature?

There is too much variability among students to answer that question. Student backgrounds also vary -- large city versus small town environments.

SOME IMPLICATIONS FOR TEACHING - INNOVATIONS

Stewart Jones
College of Education
University of Illinois

A. Immediate Feedback Systems

Starting in the mid 1920's, I. L. Pressey, then at OSU, forecast a technological revolution in education. His first "teaching machine" was crude by today's standards but it showed that with a very simple device students might take a test and get the correct answer before proceeding to the next question. He even anticipated B. F. Skinner by 30 years in having a reward (a life saver) roll out of a slot for each correct answer. This earliest device was displayed at an APA meeting in 1923. In the years that followed other devices were constructed. Two, the punch board and the chemo card, have had fairly widespread use in experimental and instructional programs. Each is a simple device for automatically recording students answers and informing students when they are correct.¹

In the late 1950's other psychologists extended that earlier work and began fitting it to the rapid advances in electronic technology. Thus B. F. Skinner of Harvard developed his teaching machine and his method of programming, which was essentially a series of small sequentially arranged steps with a high degree of redundancy and a low error rate. Others like Norman Crowder developed branching programs and "tutor-texts", which presented initial material and then guided students to further work on the basis of their early responses.²

Variations of both types of programs have been incorporated into the new large electronic computers whose storage systems will allow a number of students to work independently but simultaneously on many different courses. Plato (Programmed Logic and Teaching Operation) at the University of Illinois is but one such system of automated instruction. A plasma tube display panel (the image can easily be restored when needed and can become a part of the storage of the computer) and a keyboard is available for each student. Individual stations may be within the CSL or at other points on the campus, or even at distant locations.

¹This system has been neatly applied by Dorothy C. Adkins in her Habesticstext. C. E. Merrill, Columbus, Ohio, 1964. As the student proceeds through the text he is asked questions he answers by selecting an alternative, moistening his finger and placing it on the appropriate dot. If he is correct, the dot turns green.

²The Auto-Tutor was a first attempt to develop a self-contained machine with sufficient storage to take care of a branching-type program.

There are numerous other examples of technological aids to education. Nearly all add feedback to the instructional presentation. It is the feedback feature that adds a new dimension to the already burgeoning audio visual aids industry.

B. Systems for Individualizing Instruction

While the "programming boom" promises the ultimate answer in individualizing instruction³, there are other developments worth noting. One such innovation is publishing individualized textbooks. Already such a text series has been set up in the high school and two publishers are working on individualized texts in psychology. Self selection of texts does not mean that the student chooses anything he wants to read, but it does mean that a professor of Agricultural Economics at Kansas State could compose his own text from chapters and articles numbering in the hundreds.

For students who need special help or review, there are also some new ideas. One that we are using is a telephone circuit connected with dormitories whereby a student can dial a number and listen to a tape of material that he wants to review. We are probably only a step away from the time when a student who is perplexed about some point in his classwork can be given access not only to that material but special explanatory help and exercises without getting his professor out of bed or going to the fraternity files.

A final example of plans for individualizing instruction involves the use of sophisticated types of simulation whereby each student can be placed in a situation very similar to the one for which he is being trained. Thus a student teacher may be put into a micro teaching laboratory, or be confronted with a battery of cameras that project classroom situations for him to cope with. Medical students are performing operations on audroids and are also doing diagnostic and therapeutic work with a computer that simulates the symptoms of a patient and yields clinical test results identical with those that would come to the doctor in a hospital.

Some professors in our School of Veterinary Medicine at Illinois have found that the simple matter of writing situational-type examinations has increased interest among their students, and at least one professor now views his own clinical work with an eye to picking out particularly good "mock" exercises for his pre-clinical students.

There should be many opportunities in the College of Agriculture to provide each student experiences that are close approximations to the ones he will later face.

³According to some programmers all students should earn A's, some will take a little longer.

C. Plans for Active Class Participation

While the lecture-method as a sole method of instruction does not guarantee inactivity, it allows it. Those who argue against the lecture method on the grounds that it may not only allow but foster mental apathy are hard pressed to explain why in comparative studies of teaching methods the lecture has pretty well held its own against all comers. The reasons for such research results would make another story. At the moment let's assume, as most do, that other things equal, students will learn more if they take an active part in the doings of the classroom. Several innovations besides automated teaching may be noted. First of all might be mentioned the various methods of classroom interaction analysis devised by Flanders, Withall and others. Their analyses are a useful tool for studying classes and giving some clues as to ways to improve class operation.

While not a new idea, mention should be made of the growing trend in carrying activities beyond the walls of the classroom into the community. Various plans for work-study, observation, case analyses, etc. are becoming more and more common. In one instance in my own field students in educational psychology are required as a part of their courses to select one child, give him a pretest, write an instructional program for him, teach him and then give him a post test.

Some instructors report success with a coach-and-pupil arrangement (similar to the old lab-partner idea) where one student, for instance, performs a laboratory operation while another serves as observer and critic. I have found a great increase in close participation following an exercise in which I give a test or review exercise to students who work cooperatively (one answer sheet for each four or five students).

Unfortunately many instructors try to get class participation by having students give oral reports in class. While there may be some values in these reports, the method is generally held in low esteem by those who have used it and analyzed its results. Better it seems to me are procedures whereby groups of students work out projects or exercises and present a synopsis of their work to the class.

The project method based on some real and significant problem is still the surest way to guarantee active participation. This method is widely used in vocational agriculture in high schools. It has been very successful, and there seems no reason why it should not be applied in university classes.

Let me say finally that the innovations presented the first night of the conference go beyond what is being done in most universities, and I compliment you on being a faculty with such a keen desire to improve what is already an excellent instructional program.

Plenary Discussion with Consultants

(Jones and Owens)

Is it harmful to the student if course sequences are not always followed?

Generally curriculum sequences are good, but some students are benefitted by seeing the final course or applied course first instead of isolated and what-appear-to-him unrelated facts.

Do you believe that student evaluation of courses is desirable?

The University of Illinois has instructor evaluation, but its value is questionable. Certainly student evaluation of courses would be helpful and healthy if a good system for evaluation could be devised.

Is there a relationship between student performance and the evaluation of courses and instructors?

There is a very low correlation.

Has the rate of student learning been compared using lectures vs. tapes vs. films, etc.?

I don't know if such comparisons have been made. The effectiveness of a lecture depends on the individual instructor so it would be difficult to make comparisons.

Have comparisons been made of an instructor's effectiveness in a given course at various times during a period of several years?

I believe some studies have been conducted along those lines, but I can't give specifics.

What materials are available to inform us of the best methods of teaching?

Many new books in recent years have been devoted to college teaching. Some of them are on display in the back of the room while others are available at Farrell Library.

Do you believe that core curriculums are necessary for freshmen?

I am well pleased with the various courses listed in the core curriculums. The courses in such curriculums are best for most freshmen.

Recorded by: William Carpenter,
Hort.-Forestry



A recreation session encouraged informality.

AN ADMINISTRATOR LOOKS AT TEACHING

Carroll V. Hess
College of Agriculture
Kansas State University

I welcome the opportunity this symposium provides for us to share views on teaching. The faculty, I believe has a right to be explicitly informed of administrator's views on the teaching function.

My objective here is three-fold, to outline very briefly:

- (1) my views on the changing philosophy of the modern, evolving Land Grant University and its changing role in higher education,
- (2) the mission of the college teacher and forces operating to change his role, and
- (3) the implications of this changing role for teachers and administrators in attempting to strengthen and enrich teaching.

Higher education, long a repository for knowledge, has become the chief instrument to expand and to apply knowledge. Its clientele has become the whole of society, which has increased the number and weight of its responsibilities. Research has moved to the center of the educational stage. This pursuit of knowledge has brought a new pattern of qualifications, expectations and conditions of work to the academic professions. The new pattern of academic success calls for more emphasis on research, less on teaching. Thus, teaching, once the major responsibility of higher education, must now serve a co-existing function with research and public service. Debating the relative priorities no longer is meaningful. Now it is both possible and necessary to search for knowledge, to disseminate and deposit it, and to apply it.

Society is becoming one vast school, with higher education a less distinguishable part of society. No longer can we think of universities simply as a community of scholars (faculty and students) separate from the community. Now learning must continue throughout life. We, as members of university faculties, must help our institutions release our energies more effectively so society may utilize our many services more perceptively.

Knowledge Belongs to the Public

The newly emerged higher education with its specialized knowledge has become, in a sense, a public utility, serving indispensably the entire population. It can no longer withhold services, because those who need its services cannot do without them. Thus, the activities of higher education are guided by the needs of those whom it can

serve. As a servant of public interests, higher education is no longer free to determine either the kind or the quantity of services or the conditions under which they will be provided. Like a public utility, higher education has become subject to those it touches and to those who require its direct services. Through federal and state intervention and support, higher education is being brought to the consumer -- with the establishment of community colleges and other urban institutions of learning. Areas once lacking higher education now will have it available, much as the REA made electricity available to farmers. New programs will be created to channel "hard" knowledge of higher education into solving every conceivable kind of problem. Broadening cooperative agricultural extension and other continuing education efforts are good examples.

Also, a world dimension is being introduced into U.S. universities. The International dimension will permeate more and more facets of our educational process. The State, the Nation is no longer our campus. The world becomes our campus. Teachers must recognize this in their teaching where their subject matter has international relevance. It is quite likely today that any given university class now has students in it who will serve abroad in other than military pursuits.

The Mission of the College Teacher

Over 326,000 college instructors this fall will be teaching the nearly 6-1/2 million full-time degree credit college and university students.¹ Within the next decade, nearly another 6-1/2 million faculty will have to be recruited to replace those who retire, die, or leave college teaching and to expand the staff to accommodate the then nearly 10 million degree-credit college students.

Who are these college teachers and what are they trying to accomplish? Are their roles changing significantly over time as they face their unprecedented challenges? Although some studies have thrown some light on their characteristics and their roles as teachers, there is a considerable gap in our knowledge. Rarely has our research centered on these academic men and women, even though they prepare the highly educated persons to serve our society.

Historical observations suggest that college teachers share three basic and closely related concerns, namely:

- (1) to develop the student's full human capacity,
- (2) to provide a continuous stream of educated manpower, and
- (3) to pass on the human legacy of culture and civilization.

Most faculty would generally underwrite those functions although their relative stress on each would vary among subject matter fields,

¹Projections of Educational Statistics to 1974-75, 1965 Edition, U. S. Department of Health, Education and Welfare, Office of Education, OE-10030-65.

level of instruction, professors' interests, and institutional expectations.

To be more specific, the teacher's first task is to free the student from ignorance, prejudices, fears, anxieties and other restrictive influences so he might be free to learn and to know the truth. All professions and disciplines contribute to this great goal of liberal learning.

Second, the teacher is responsible, whatever his particular competencies or specialty, for helping students prepare for some kind of specialized service(s) which requires collegiate or graduate education. This may be accomplished by extending the array of the student's possible career choices, or his perspective for evaluating choices and making decisions, by developing basic understandings of the field or by cultivating specific job competencies. Thus the student and teacher play important roles in sorting and identifying as well as in developing specialized talents.

Third, the student is a kind of bridge, with the teacher, between the past and the future. Together they insure a vital link in our culture and civilization. The teacher's efforts, the capital stock of facts, ideas and values is transmitted through students to oncoming generations. If the teacher senses fully his responsibility, he will see that this heritage is passed on, enriched and extended through his and other scholar's work and through creative applications of principles and other knowledge to problems of his own time.

These cardinal responsibilities may be fulfilled in a great variety of ways. The term teaching as used here suggests far more than a performance before a class with a teacher "giving" and a student "taking" a course. If the aim is to develop self-sufficient and responsible, free people, teaching can and must make a potentially great contribution. The task of teaching grows in importance as students' learning expectations are heightened.

The Changing Role of College Teachers

Strategies for attaining those three primary objectives change from time to time as tensions within and outside the academic community change and thus sharply modify methods and roles of college teachers. The factors that demand some redefinition of the college teacher's role include the following:

- (1) The dramatic explosions in knowledge calls for constant updating of both the teacher's insights, skills, understandings, and values as well as those of the students. We have scarcely begun to cope with the powerful counter-forces arising from this doubling of knowledge every eight to ten years in many fields. Not only must students learn more in specialized and applied fields, but they must also enlarge their

understandings of developments in related sciences, and gain far broader insights into their nonvocational roles -- as family members, as citizens, and above all, as reflective and sensitive human beings.

(2) The sky-rocketing number of students seeking college educations and the increasing diversity in their social origins, their abilities, and their life goals also pose new challenges. Much more must be known about who these students are (including the most vocal and bearded ones), why they are in college, and how programs can be developed to serve them better. This applies to professional colleges as well as liberal arts colleges. Today's students differ notably from those of a generation ago, even from the generation that included you younger instructors. It is therefore difficult for most college teachers to understand, let alone respect, contemporary students' powerful search for identity, for personal freedom, and for vigorous involvement in social action. The Berkeley student rebellion reflected the values of a segment, at least, of the current generation of students. The present generation of agricultural students is not likely to insist upon their demands in such a vigorous manner, but in time, they too will expect and demand a role in educational planning. I support increased opportunities for students, professors, and administrators to talk and think together, to reflect more comprehensively on the strengths and weaknesses of our educational system and to invent and implement ways to make our colleges more humane, more personable, and above all, more stimulating to growth for both faculty and students.

If the gaps between the administration, teacher, and student can be bridged, a vital source of energy and insight into important educational and social issues can be constructively used. Students don't want their hands held -- they want a really good education. They want access to the faculty as we continue to provide access in our College of Agriculture. Students resent faculty alienation. I believe the major task facing higher education today is to redefine a really good education for today's youth and to determine the extent and manner of student participation in the evaluating and redefining process. I think colleges and universities must listen with critical attention to these revolutionary voices, especially when they emanate from young men and women who are brighter and better informed and more serious than any of their American predecessors -- and most of their classmates.

(3) Fresh insights gained, particularly since World War II, into the nature of human development, the learning process, and individual differences, to select only a few significant areas of socio-psychological theory, are similarly affecting our concept of the college teacher's role. Such insights have been the major focus of attention at this symposium. With far

more knowledge today about the strong influences on learning of motivations, of students' early family and school experiences, of their peer society, and of college environment, the really perceptive college instructor knows that he is but one of a complex of forces, which, if not coordinated, are likely to be ineffective. Teachers must therefore search for and utilize several avenues of influence to stimulate students' learning. Clearly this requires that they be more than competent scholars in their fields, although this remains a basic qualification.

(4) The past twenty years has been marked by an almost incredible multiplication of new media and technologies for recording, storing, retrieving, distributing and presenting materials to students. These developments seem to threaten some teachers, most probably those teachers who B. F. Skinner has suggested should be replaced by teaching machines. However, the new technologies and media provide undreamed of ways to extend the talents of good teachers. Television, for example, still in its early stages of educational development and showing up quite well, can unquestionably take over some tasks that now claim teachers' time and efforts. This should allow more time for what machines can never provide, namely spontaneous interactions between teachers and students. My concern here is that persons with a sound philosophy of education quickly adapt these new teaching and learning media before the gadgeteers and culturally illiterate take over.

(5) Most faculty members, particularly in professional colleges, do more than teach. Most spectacular has been their scholarly and research roles. The "publish or perish" dictum has caused many young instructors to rush into print prematurely, while thousands of their senior colleagues have become entrepreneurs on a mass scale, bargaining to attract and administer large research grants. While others have simultaneously promoted their own disciplines on and off campus and to a lesser degree have become policy makers in the academic and governmental communities. There has also been a notable flight off campus as faculty members are increasingly drafted for services as consultants and demonstrators. These other roles can become so luring and financially attractive that they crowd out time for teaching preparation and for any real dialogue with students. Yet these experiences can and very often are used imaginatively to add color and vitality to college teaching. While research and teaching are essentially competitive for the same limited time and institutional resources, they can be pursued to be mutually supportive. Teaching and research are extricably related. The major aspect of teaching is to encompass and integrate the lessons of research. This intimate relationship negates the assumption that teaching and research must be performed by different people.

The professor who himself has stood perplexed before problems may establish a closer relationship with students struggling to achieve understanding than can the teacher who simply purveys other people's ideas. Thus research and teaching, although they can be incongruent in nature, can become mutually supportive. Our task as scholars and teachers is to make research and teaching complement and support each other.

(6) Last, teachers must be brought under close scrutiny in this age of uncommonly urgent problems. Henry Adams wrote so prophetically in 1910 that as we live in years marked by sharp and fateful "acceleration of history", we must search out ways of using "history in the making" to enrich students' learning. But unless many college teachers also participate directly in its shaping, students may fail to discover worthy models for enlightened social action. Signal examples at high policy levels are James Conant, Walter Heller, McGeorge Bundy, John Galbraith, Arthur Schlesinger, and many other such faculty members of today's colleges and universities who are more involved than ever in national and international affairs.

These are the major factors, which I believe force changes in the college teachers' role in today's society. As scholars and teachers, you must be cognizant of such forces that are altering the strategies for attaining the objectives you have set forth.

Teacher Shortage

Successful college teachers, by overt testimony before students, are the best recruiters of able minds for the college teaching profession. Supplementing the successful college teachers with monetary aids to support graduate assistants working toward Ph.D. degrees and college teaching will go far to remedy the teacher shortage. Of course, improved salaries and fringe benefits for outstanding teachers will need to be competitive with those for outstanding researchers. The two are so closely related that salaries should not vary widely between them. However, higher salaries will not immediately solve the present shortage of competent college teachers.

Implications for Teachers

What implications then does the present shortage have for college teachers? I believe teachers should be quick to sense the necessity of exploring approaches to teaching that conserve scarce teaching resources. Alternatives to the conventional lecture or lecture-discussion-laboratory already exist and have often proved superior for contributing to students' educational experiences and/or stretching teaching resources. I refer here to such efforts as programmed instruction or independent study, either as part of an honors program or simply to provide flexibility and opportunity for independent study and growth.

Conventional honors programs at the junior-senior level for gifted or even good students, involving as they do small classes, much counseling, and a low student-faculty ratio, are expensive. General honors programs that reach down into the freshmen-sophomore classes with fewer but larger sections are somewhat less expensive. Independent study programs, where the objective is to involve the student in the learning processes as much as possible and to encourage him to think more and to use more critical methods of study, are one answer. Most such experimental efforts have given very satisfactory results, as judged by students' learning experiences. Programs explicitly pointed toward the goal of self-directed learning merit the term "independent study", whatever form they take, to distinguish them from conventionally organized instruction where teachers are said to "give" and students to "take" courses.

Wasteful instructional methods

Somehow we must "break the academic lockstep" that today dominates instruction. We are all aware that students learn at different rates and by different means and that rate and amount of learning vary with such complicated matters as motivation, perception, organization, feedback mechanisms, active participation rather than passive submission. Knowing those variables makes it obvious that the established pattern of instruction in lecture-discussion groups of medium size meeting at regularly specified intervals in conventional classrooms is gearing instruction to a tiny homogeneous minority, and is a wasteful, inefficient system in a country committed to educating the vast and heterogeneous majority. The conventional classroom-lecture type of instruction must give way to the inescapable fact that already we have too few qualified teachers and too few classrooms to accommodate present enrollments, much less the anticipated surge of the future.

Perhaps a better reason for more independent study is that persons in all professions must expect to continue learning throughout life. Mere acquisition of facts and abstract principles is far from enough to produce an educated man. The body of knowledge in agriculture, as in most fields, is increasing at a dazzling pace. To remain effective in a profession, students must free themselves from relying on instructors and digested textbooks and perfect at least some tools of independent study.

The President's Committee on Education Beyond High School recommended vigorous and objective exploration and application by faculties and administrators of methods to increase the effectiveness and productiveness of teachers, including instructional procedures which place more responsibility for self-education on individual students, with subsequent diminished emphasis on formal instruction time.

New Communications Media and Classroom Facilities

Also we must seriously explore the new media in communications equipment and data processing. I refer to closed-circuit television

and devices for recording, storing, retrieving, or reproducing information in a manner that encourages learning. Specific examples are instructional and research films, programmed learning, language laboratories, film loops, audio tapes, video tapes, and presentation and feedback systems.

We should also be cognizant of recent improvements in teaching auditoriums for large classes and in learning resource centers. These new media and facilities should be viewed as having great significance to education. The full range of ways to transmit what is to be learned must be assessed. This means that campus buildings and classrooms can no longer be designed with the janitor and maintenance staff in mind rather than the student and teacher. The focus of any "systems" approach to planning for and using media must be on student learning activities and how they affect student development. We are seeking the least cost per unit of learning, with fewer teacher-student contacts required compared with the conventional classroom-lecture method.² There is, of course, an important place for the lecture approach. But often alternate instructional approaches are more appropriate and efficient. Honors programs should be considered where teaching resources are available. Competition for scarce teaching resources must be recognized.

Flexibility and innovation needed

Flexibility and innovation should dominate teaching approaches. There ought to be lively and persistent inquiry in your department, on how instruction might better capitalize the talents of teachers and students. Instead of accepting what has been merely habitual, the entire academic community -- including students, teachers, counselors, librarians, researchers, systems specialists and administrators -- should be dreaming up and testing hypotheses relating to instruction. Phillip Coombs suggested that in no other area of the academic enterprise is there a greater need than for a Vice-president or a Dean of Heresy. But such a person's best efforts are futile unless those on the "front lines" are constantly letting their imagination and ingenuity run loose to generate ideas worthy of study. Since most experiments to date have operated within the context of the system in which we have grown up or in which we are caught, we do not actually know what teachers could accomplish if they were freed from many of the "givens" such as the neat packaging of knowledge into courses and set patterns of class attendance and credits. Student, colleague and community expectations are that teachers will continue to provide easily assimilated academic pabulum while devaluation of the teaching role of faculty continues on many campuses. To offset this, Ruth Eckert at the University of Minnesota says three things are needed:

- (1) faculty members and students must be willing to take some risks to improve college teaching;
- (2) administrators must courageously support such efforts; and

(3) an informed public, including college trustees, must underwrite what John Dobbin of the Educational Testing Services has colorfully referred to as "a retirement system for outmoded educational assumptions."

Implications for Administrators

What are the implications for administrators of student enrollment pressures, program proliferations, and teacher shortages? The administrator is faced with three responsibilities:

- (1) to provide high-quality instruction,
- (2) to recruit and hold a portion of the finest minds in the academic community, and
- (3) to establish an academic climate that encourages scholarly and innovative work by the faculty.

Administrators can use rewards to sharpen the sensitivity and sense of judgment of faculty members to divide their time between research and teaching. The two are mutually supporting so both can be met adequately. Too frequently, despite realizing the crisis in teaching, administrators set up and faculty members respond to the publish-or-perish system. The result is continued deterioration in instruction. Academic administrators can no longer be content or quiescent about the situation. They must upgrade teaching while enrollments increase so youth can benefit from the knowledge explosion. Criteria and instruments to accurately appraise effective instruction need to be developed and utilized by administrators to reward outstanding teachers. Excellence in teaching must be rewarded alongside excellence in research and public service. Special efforts to provide prestige and stature to good teachers are essential for high morale and prolonged tenure on a campus. Also, the link between good teaching and good scholarship must be strengthened and preserved. This is not just a problem for administrators but for individual faculty as well. This is where the battle for effective teaching will be won or lost. I wish also to make the point that funds must be provided to improve physical facilities for the teaching process (visual aids, office, library, classrooms, teaching resources, etc.) as well as funds to support both research and publications that are related to improved teaching.

Opportunities should be provided in graduate programs for aspiring college teachers to incorporate formal course work such as college teaching methods, psychology of learning, and educational psychology as part of their course requirements, not as supplemental course work, and supervised teaching opportunities should be provided for such graduate students.

Administrators who create an academic atmosphere in which teaching is considered as important as research and public service will find potential teacher-scholars emerging to march side by side with research-scholars. This is the climate in which scholarly work thrives best. Without such a climate we find a continuing serious vacuum in the undeveloped talents and capacities of students.

In short, administrators must exhibit greater willingness to reward, to support, and to display proper respect for excellence in teaching if teaching is to improve. I can assure you that your administration subscribes to that philosophy.

Summary

In summary, I sense a spirit of genuine criticism of American education, a forerunner of improvement. I feel that our national conscience is troubled by the realization that in general we have failed to establish and maintain quality educational programs. There is an increasing concern for our failure to cultivate fully the talents and capacities of our people and a realization that we are not adequately satisfying the demands that our national life places on our educational processes. We are often guilty of sacrificing excellence because we have been unwilling to pay the price that excellence demands -- rigor, discipline, and genuine hard work. Too often, as teachers, we have failed to challenge the full capacity of our students and thus have betrayed the great democratic principle in our educational process, which is that all men are not of equal capacity but all are entitled to develop fully the capacities they have. We must seek the kind of education that will open their eyes, stimulate their minds and unlock their potentialities.

We have great teaching, but the quality of teaching generally is lower by far than it should be, and lower too, than it need be. The reason lies in a stubborn refusal of our society to commit to the teaching profession a large enough measure of the best that we have in human resources. Thus I conclude that the quality of teaching is our basic educational problem.

In the last analysis, the quality of our schools will depend primarily on the quality of our teachers. Here, without any question, is the heart of the problem; and here is our central task -- to bring to the classroom, seminar, and laboratory a large number of teachers with the high qualifications necessary for the full success of the educational enterprise. One of the keys to the quality of our educational enterprise is the conviction held by the faculty to teach effectively. Class size is not the critical factor in teaching effectiveness in higher education, but rather the quality of the teaching.

Perhaps the near panic of recent years will awaken a new concern for achieving quality in the face of increasing students and teacher shortages. I believe that we have begun to examine critically some of

the long-held assumptions as to the nature and organization of the teaching and learning processes. Your participation in this symposium is symbolic of this.

President Johnson recently declared, "Education is the first business of our society." This appears correct for it is our enormous capacity for learning that sets us apart from other forms of life and makes us distinctly human. And, it is through good teaching, as conceived in this symposium that these unique abilities are discovered, cultivated and put to creative use. What greater reward can one expect from his life's work than to help students realize their full humanity? As counselor or friend to prospective college students, what greater contribution can we make than influencing and cultivating proper attitudes in youth toward learning, education, achieving, or toward intellectual activity. Our resource persons have singled out these attitudes as major determinants of how well students perform in college and in life.

Permit me to close with a quotation from Dr. Sterling M. McMurrin, former Commissioner of Education in the U.S. Office of Education. He says, "Quite certainly the key to the quality of our entire educational enterprise is the intellectual strength of our teachers, their grasp of the aims and purposes of education, the quality of their own liberal education, and their competence in the subjects they teach."³

I share this conviction, just as, I am certain, each of you does. The challenge before us in this symposium and in subsequent instructional seminars is to improve our understanding of the principles un- girding the learning process and their application in our instructional approaches in the constant quest for quality teaching. Let us return to campus, stimulated and committed to achieving this task.

³Talent and Tomorrow's Teachers, The Honors Approach, New Dimensions in Higher Education, Number 11, U.S. Department of Health, Education and Welfare, Office of Education.

PARTICIPANTS IN
TEACHING---LEARNING SYMPOSIUM
College of Agriculture
Kansas State University

Rock Springs - September 5-7

Agricultural Economics:

Milton Manuel
John McCoy
Frank Orazem
Paul Kelley
John Sjo
Ivan Werner

Agricultural Education:

Howard R. Bradley
James Albracht
Ray Agan

Agricultural Journalism:

Delbert Brinkman

Agricultural Engineering:

Paul Stevenson
Earl Baugher
Ralph Lipper
Carl Anderson

Agronomy:

R. V. Olson
K. C. Feltner
J. A. Hobbs
E. L. Mader
C. E. Owensby
W. L. Powers
G. E. Wilkinson
E. G. Heyne
H. S. Jacobs

Animal Husbandry:

Ben E. Brent
Walt Smith
Don Kropf

Animal Husbandry (Con'd)

Berl Koch
Guy Kiracofe
Carl Menzies
Robert Schalles
Jim Hoover
D. Richardson
Calvin Drake
Harold Tuma
Miles McKee
Ed Smith

Biochemistry:

Ken Burkhard
Howard Mitchell

Dairy & Poultry Science:

A. W. Adams
Keith Huston
Dave Mitchell
James Morrill
Dave Mugler
C. L. Norton

Entomology:

Derrick Blocker
Robert Mills
Charles Pitts
Carl Rettenmeyer
Hugh Thompson
Richard Elzinga
Gerald Wilde

Extension:

Curtis Trent
Warren Prawl
Robert Johnson
Oscar Norby

Grain Science & Industry:

E. P. Farrell
Ed Hayes
William Hurley
Arlin Ward

Horticulture & Forestry:

W. J. Carpenter
Charles Hall
Wayne Geyer
Ray Keen
Neil Miles
Richard Odom
Charles Long

Plant Pathology:

O. J. Dickerson
Earl Hansing
Don Stuteville

International Agriculture:

Harold Severance
John Dixon

Dean's Office, College of Agriculture:

Lowell Brandner
Frank Carpenter
Carroll V. Hess

Dean's Office, College of Education:

James D. McComas

Consultants:

David Danskin
R. Stewart Jones
Richard Owens

