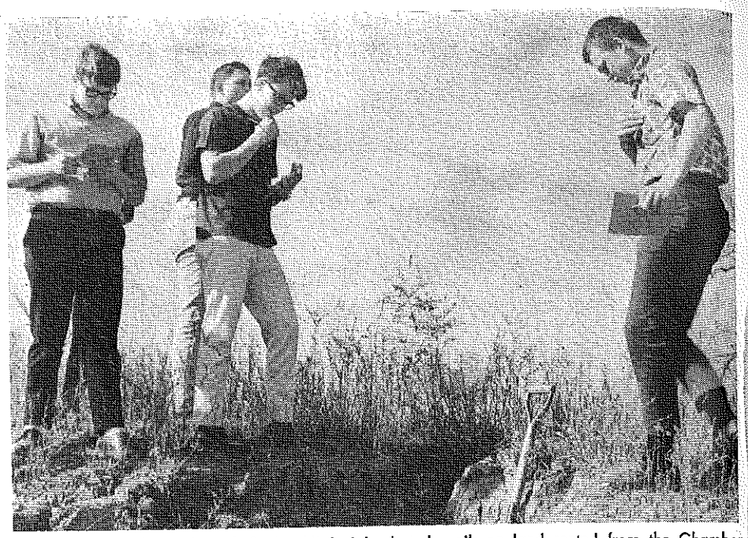
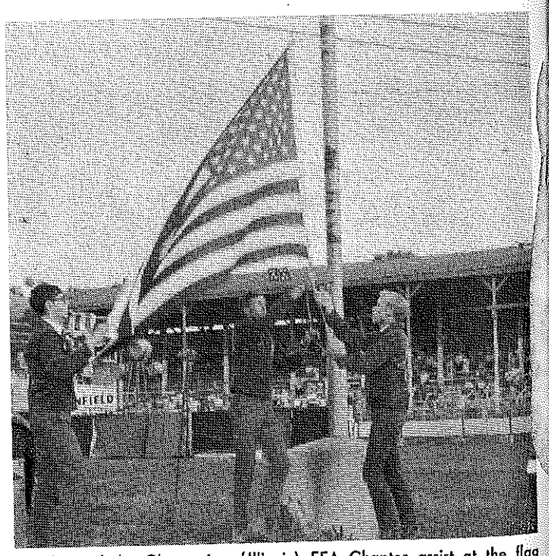
Stories in Pictures

ROBERT W. WALKER
University of Illinois



Students at Oskaloosa (Iowa) Senior High School study soils on land rented from the Chamber of Commerce. Soil profiles are taken back to the classroom so students can identify soils and plan fertilizer practices. (Photo by John Pothoven, Teacher of Agriculture, Oskaloosa, Iowa)

L. W. Davis, Consultant, Allis-Chalmers, Milwaukee, Wisconsin, served as a guest speaker at a symposium on nonfarm agricultural occupations held at Montana State University. The symposium was sponsored by the Montana State Collegiate FFA Chapter. Mr. Davis is a trustee of the National FFA Foundation. (Photo by Douglas D. Bishop, Montana State University)



Members of the Champaign (Illinois) FFA Chapter assist at the flag lowering ceremony at the county fair. The FFA Chapter also sponsored a youth tent at the fair to explain career opportunities in agriculture. (Photo by Roger Francis, Agricultural Occupations Instructor, Champaign High School)

Agricultural Education

Volume 43 November, 1970 Number 5

Featuring —

RESEARCH IN AGRICULTURAL EDUCATION

THE
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MAGAZINE

Vol. 43 November, 1970 No. 5

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Editorials

From the Editor . . .

Enhancing the Impact of Graduate Students' Research

J. Robert Warmbrod

Invariably reviewers of research in agricultural education pointedly allude to the fact that the profession's researchers are primarily graduate students. The corollary of this observation usually is the call for a greater commitment to and production of significant, well designed research by experienced agricultural educators, particularly those in colleges and universities. Hopeful expectations for remedying this state of affairs were aroused when substantial funds were first earmarked for research in the Vocational Education Act of 1963. Apparently the appropriation of special funds for research in vocational education has not been accompanied by a perceptible shift from graduate students to professionals as researchers in agricultural education. So, for the foreseeable future at least, we must renew efforts to insure that graduate students' research is not only competently conducted but also results in needed and noteworthy improvements.

Actually graduate students have some things going for them which enhance their role as researchers. Most master's degree candidates are practicing teachers; in almost all cases doctoral candidates are the more imaginative and competent teachers who have just left teaching, supervisory, or teacher education positions. This experiential background should serve them well in selecting urgent and troublesome problems for investigation. As one writer in this issue correctly points out, the standards and requirements for graduate research in most universities, particularly at the doctoral level, encourage and in many cases insure research that is as well designed and methodologically sound as that of the more experienced researchers.

These potential strengths are frequently offset, however, by factors that limit the impact of graduate students' research in contributing to sound theory or improved practice. By and large, graduate students' research is a series of independent and disconnected studies. In a real sense, limitations of time and money restrict problems

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Guest Editorial . . .

The Good Is the Enemy of the Better

Gordon I. Swanson

"The good is the enemy of the better." These were the words used by Dr. Mohammed Nour, Dean of the Faculty of Agriculture in the Republic of the Sudan, as he adjourned the First World Conference on Agricultural Education held in Copenhagen from July 28 to August 8, 1970. With these words, Dr. Nour reiterated the sense of urgency which had been expressed by participants from more than 100 countries. He added new phraseology to the two admonitions which had transcended the Conference, namely, that traditional methods and systems of organization often became the greatest deterents to progress, and that it has now become necessary to devote as much attention to research in agricultural education as has been given to the technical specialties in agriculture.

Gordon I. Swanson is Professor of Agricultural Education and Coordinator of International Education, College of Education, University of Minnesota, Minneapolis.

These admonitions were not directed solely at the developing countries; they are equally, if not more, applicable to the highly industrialized countries. Moreover, they were not intended to be unrelated. It has become traditional and almost axiomatic, for example, for the field of agricultural education to operate with the most meager resources of research support. During the first 50 years of the existence of the field, the total federal expenditure of all federal agencies for research in agricultural education was $7,000, or an average of about $140 per year. Since the initiation of the USOE Cooperative Research Program and the subsequent Vocational Education Act of 1963, the federal expenditure for research in agricultural education rose to $221,000 in 1968. If this expanded sum were divided equally among states, it would have provided a mere $4,420 per state, an amount that is insufficient to maintain the credibility of a federal commitment.

These statistics, recently reported by the USOE Office of Program Planning and Evaluation, provide accurate data on expenditures by all federal agencies for each field. Not

(Continued on next page)

From the Editor . . .

which graduate students can feasibly investigate to those that may not be the most crucial or significant. Finally, the graduate student's primary goal is reporting not implementing findings.

The responsibility for enhancing the contribution of graduate students' research to change and improvement rests primarily with teacher educators, particularly those in the eight or ten major universities granting most of the doctoral degrees to persons whose interest is agricultural education. While capitalizing on the resources which contribute to methodologically sound studies, faculty members need to concentrate on alleviating the lack of impact of graduate students' research. Encouraging in-depth investigations of manageable and significant problems is a good place to begin. Perhaps major professors should take more seriously the conclusions, implications, and recommendations for further research which their candidates present, often at the insistence of the major professor, in the final chapter of the thesis or dissertation. These recommendations can very well be the takeoff points for additional research by faculty members and new graduate students, provided these researchers have an interest in and a concern for the problems and issues being investigated. After all, a first-time probe of almost any significant problem turns out to be largely exploratory which frequently yields more questions than answers.

Faculty members can make substantial contributions by accomplishing two additional tasks. First is the decoding and popularizing of the valid findings and conclusions of graduate students' research. Second is the active promotion of change in programs and points-of-view warranted by the research. It takes considerable effort to move from research to practice. In agricultural education, teacher educators must assume this role more vigorously. —JRW

Guest Editorial . . .

included, however, are state and institutional expenditures which have financed the bulk of the research in the field of agricultural education.

It is clear that meager federal expenditures for agricultural education have become too commonplace and too traditional. While the federal government continues to finance about 40 per cent of all research in technical agriculture, its support level for research in agricultural education is below 5 per cent.

Focus is thus placed on the second part of the admonition — the need to achieve balance between the research inputs in agricultural education and those in technical agriculture. The evidence of this becomes more obvious with each passing year. As one travels through the rural communities and small cities of America, he begins to observe a phenomenon that is increasingly predictable even before his arrival in the next community. In a pattern of repetitive consistency it is now possible to observe that some businesses and a few of the farms are highly successful while another category of businesses and most of the farms are in a less successful category. In the successful category are the banks, the franchised food preparation businesses, and a few well known drug and dry goods chains. In the less successful category are most of the hardware stores, the produce businesses, the appliance businesses, and many of the implement businesses.

What is the distinguishing feature which separates the successful farms and other businesses from those in the less successful category? It is the utilization of a management information system together with a management evaluation system which most often draws upon resources outside of the environs of a single business enterprise. Like a professional golfer, the successful farmer or businessman is concerned with the "par" for the course as well as his own previous performance. Only the second of these criterion measures can be established without the help of others. The weakness in this analogy is that par in golf is a static concept while par in business is a dynamic concept relying upon constantly changing efficiency factors and continuous instructive inputs.

What does this pattern of successful and unsuccessful businesses have to say to agricultural education and research? A new era has been entered. The continued emphasis on research in technical agriculture and the adoption of technological improvements is no longer sufficient to result in a pattern of success. Many of the unsuccessful farms are as technically up to date as the successful ones. More important is a systems-analytic approach to management evaluation and a system-controlled efficiency. Accordingly, it is no longer sufficient for agricultural education to be a conveyor of approved practices; the field must rededicate itself to systematic instruction, albeit the most modern type, a feature of vocational agriculture which has always distinguished it from all other forms of agricultural education. Most of all it requires that the entire profession join in mobilizing more resources and more energy toward research in agricultural education.

In doing so, it may be necessary to accept the fact that the spirit of inquiry is not always gentle; research often yields conclusions which threaten the field in which it is conducted. It is also possible, thus, for the better to be the enemy of the good!

THE COVER PICTURE

W. A. Clawson (second from left), Teacher of Agriculture at Tates Creek High School, Lexington, Kentucky, seeks assistance on a proposed research project dealing with the development of programmed teaching units. Consulting with Mr. Clawson are (left to right): Dwight Cline, Supervisor of Agricultural Education, Kentucky Department of Education; W. A. Clawson; Glenn Collins, Instructional Materials Laboratory, Harold Binkley, Chairman of the Department of Vocational Education, and Floyd L. McKinney, Research Coordinating Unit, all of the University of Kentucky; and Jimmie Judge, Supervisor of Agricultural Education, Kentucky Department of Education. (Photo by Floyd L. McKinney, University of Kentucky)

Research in Agricultural Education: A Critique

J. DAVID McCRACKEN
The Ohio State University

J. David McCracken

J. David McCracken is Information Specialist, ERIC Clearinghouse on Vocational and Technical Education, The Center for Vocational and Technical Education, and Assistant Professor of Agricultural Education, The Ohio State University, Columbus.

What is the role of research in agricultural education? "If the object of such (educational) research is the development of coherent and workable theories, researchers are nearly as far from that goal today as they are from controlling the weather. If the goal of educational research is significant improvement in the daily functioning of educational programs, I know of little evidence that researchers have made discernable strides in that direction."[1]

Examination of previous critiques of research, such as those by Carpenter and Rodgers,[2] Warmbrod and Phipps,[3] Love,[4] and Hamlin,[5] reveals that consistent major criticisms may be grouped into four areas: a hesitancy to tackle the real, substantive and critical problems facing the profession; a lack of involvement by teacher education staffs in long-range programmatic research efforts; a failure to utilize sophisticated research designs resulting in questionable validity of research findings; and little effort toward effective dissemination and implementation to move research findings off the shelf and into the classroom.

I propose to examine these four criticisms in view of research studies recently completed, to note trends, and to suggest a future role for research in agricultural education.

Substantive Focus

Agencies which fund research projects are seeking an impact on critical societal problems. A major emphasis of Hamlin's article in the September, 1966, *American Vocational Journal* was the need for *significant* research. Is the research being done in agricultural education significant in substance?

Indicated below is the percentage of 161 research studies completed in agricultural education in 1968-69 by problem area categories. The 161 studies are those reported in the "summaries of studies series" compiled in the four regions.[6]

Problem Area	Per Cent
Administration and Supervision	11
Curriculum	15
Employment and Occupations	22
Evaluation and Measurements	14
Facilities and Equipment	1
Historical	2
Individuals with Special Needs	3
Research	2
Students, Occupational Guidance	14
Teachers, Teacher Education	11
Teaching and Learning	5

Research is being conducted in most of the substantive problem areas of agricultural education. However, one might question the cumulative impact of separate, small, fragmented research efforts in these broad problem areas.

It is particularly discouraging that only three per cent of the research projects were related to the problems of individuals with special needs. Since the Vocational Education Act of 1963, vocational educators have been encouraged to assume greater responsibility in the preparation of disadvantaged youth for employment. Agricultural education research efforts do not indicate that we are preparing to give much emphasis to this challenging responsibility.

Graduate Student Research

Research in agricultural education has, over the years, been characterized by separate, small, fragmented, individually contrived projects. Love,[7] in his critique of research completed in the North Atlantic region in 1964-66, found only 13 per cent of the projects completed by faculty researchers. A comparison of Love's finding with an analysis of persons completing research in agricultural education in 1968-69 provides little hope to those desiring a greater involvement in research by teacher educators. Of the 161 studies completed in 1968-69, 11 per cent were staff studies, 32 per cent were doctoral dissertations, and 57 per cent were masters' papers.

It is recognized that many agricultural education researchers are involved in vocational education research efforts which are not reported in the summaries of studies series. However, based on a projection of historical data, it is evident that the large majority of research in agricultural education will continue to be done by graduate students.

This situation is not without hope. The graduate student often is able to

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Research in Agricultural Education: A Critique

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complete an exemplary research effort. The review procedure necessary for proposal development and the monitoring of the project by a graduate committee sometimes results in a sounder research effort than many staff studies. Perhaps the major weaknesses of research conducted by graduate students result from insufficient funding, the short-range duration, and fragmented efforts.

These weaknesses of graduate student research can be minimized. "Other sciences have faced the transition from the Ph.D. thesis that stood on its own feet to the Ph.D. thesis that is part of a bigger entity. No Ph.D. builds this own cyclotron as part of his thesis. No Ph.D. orbits his own satellite to get his data."[8]

Until we move from research by the individual entrepreneur to a programmatic research endeavor by a coordinated, institutionally-supported research team, research in agricultural education will continue to be fragmented with minimal impact on program improvement. Many of the real "tough" problems in agricultural education can only be tackled through a coordinated long-range programmatic research project. Graduate student research can be conducted as a part of such a coordinated effort.

Design and Methodology

"Research design has two basic purposes: to provide answers to research questions and to control variance."[9] Research problems are normally stated in the form of hypotheses. These hypotheses can normally be tested in a number of ways. Designs should be carefully worked out to yield dependable and valid answers to the research questions epitomized by the hypotheses.

Experimental designs do the best job of controlling variance. Experimental studies are forward-looking. They begin at a point in time and attempt to manipulate or control variables to obtain answers to research questions. These designs provide more valid answers to research questions than survey or ex post facto research. Only 14 per cent of the studies completed in 1968-69 were pre, quasi, or true experimental in design, hence "forward looking." Most of these studies related to evaluation, curriculum, or teaching and learning.

"In ex post facto research one cannot manipulate or assign subjects or treatments, because in this kind of research the independent variable or variables have already occurred. The investigator starts with observation of the dependent variable and retrospectively studies independent variables for their possible effects on the dependent variable."[10] Sixteen per cent of the studies completed in 1968-69 had ex post facto or similar designs. Most of these studies related to administration and supervision, evaluation and measurements, students and occupational guidance, or teachers and teacher education.

A survey or descriptive type of study generally attempts to describe "what is" rather than "what would happen if." Survey research is normally used to study populations by selecting samples "to discover the incidence, distribution, and interrelations of social and psychological variables."[11] Survey research has the advantage of wide scope. The scope of the information sought is usually emphasized at the expense of depth. Seventy per cent of the agricultural education research completed in 1968-69 was of the survey type. It was interesting to note that all of the studies relating to employment and occupations, facilities and equipment, and history were descriptive in nature. This indicates that some problems are more easily researched by experimental techniques than are others.

The main function of the research design is to control variance so valid answers to research questions may be obtained. There is a danger in criticizing research methodology apart from the research problem. However, there are some recurring methodological weaknesses which should be mentioned. In survey research, major problems result from non-probability sampling, failure to follow-up nonrespondents, and questionable reliability and validity of measurement instruments. Another notable deficiency is to project findings beyond that which is justified by the analysis of data.

In general, greater concern is needed for controlling extraneous variables that might cast doubt on whether the independent variable(s) really made a difference and thus on the generalizability of the findings. Experimental research is the ideal; however, we must not fail to tackle some of the real problems in agricultural education because they do not readily lend themselves to experimental design.

In agricultural education, we need idea men who are willing to confront major issues and who have sufficient training in statistical methods and research design to develop and utilize appropriate methodology for meaningful and sound research.

Application of Research

The purpose of a research report is to report research, not to provide the educator with practical guidelines for program improvement. Reports of research and development efforts are seldom in a form that can be applied directly in the schools.

In a recent study of research utilization, I stressed the necessity of making research findings accessible to practitioners; repackaging, reviewing, summarizing, and interpreting research for practical application; conferences, workshops, and other settings which provide opportunity for interaction among researchers and practitioners; developing practical guidelines for program improvement based on research findings; and educational programs so educators may learn to identify and utilize research which is applicable to their problems.[12]

A Challenge

Research in agricultural education has made notable strides over the years. Continued improvement will result if researchers in agricultural education can show that research has and will continue to result in program development. Teacher educators, researchers, and graduate students must be willing to seek answers to key substantive problems through coordinated programmatic research efforts utilizing sound methodology. These research findings must then be translated into action in state and local programs of agricultural education. This is the role of research in agricultural education.

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[1]Shulman, Lee S. "Reconstruction of Educational Research." *Review of Educational Research.* Vol. 40, No. 3, June 1970. p. 371.

(Continued on next page)

[2]Carpenter, Earl T. and Rodgers, John H. *Review and Synthesis of Research in Agricultural Education.* Second Edition. Columbus: ERIC Clearinghouse on Vocational and Technical Education, The Ohio State University, June 1970.

[3]Warmbrod, J. Robert and Phipps, Lloyd J. *Review and Synthesis of Research in Agricultural Education.* The Center for Vocational and Technical Education, The Ohio State University, August 1966. (ED 011 562).

[4]Love, Gene M. "A Critique of Research in Agricultural Education." *Agricultural Education.* Vol. 40, No. 9, March 1968.

[5]Hamlin, H. M. "What Is Research?" *American Vocational Journal.* Vol. 41, No. 6, September 1966.

[6]Curtis, Charles M., Comp. "Summaries of Research Studies in Agricultural Education, Southern Region, 1968-69." Vo. Ag. Ed. No. 29. Baton Rouge: Louisiana State University and Agricultural and Mechanical College, School of Vocational Education. (ED 038 543).

Horner, James T., Comp. "Summaries of Studies in Agricultural Education, Central Region, 1968-69." Lincoln: The Department of Agricultural Education, The University of Nebraska, Dec. 1969. (ED 036 642).

Loreen, C. O., Comp. "Summaries of Studies in Agricultural Education, Pacific Region, 1968-69." Pullman: Agricultural Education, College of Education, Washington State University, December 1969. (ED 036 635).

Shontz, David F., Comp. "Abstracts of Research Studies in Agricultural Education Completed in 1968-69 in the North Atlantic Region." Prepared for Distribution at the North Atlantic Regional Seminar and Research Conference, Pennsylvania State University, University Park, Nov. 5-7, 1969. (ED 036 644).

[7]Love, *op. cit.*

[8]Tukey, J. W. "Analyzing Data: Sanctification or Detective Work?" *American Psychologist,* Vol. 24, No. 2, Feb. 1969. p. 88.

[9]Kerlinger, Fred N. *Foundations of Behavioral Research.* New York: Holt, Rinehart and Winston, Inc., 1965. p. 275.

[10]*Ibid.*

[11]*Ibid.,* p. 393.

[12]McCracken, John D. "The Utilization of Information by State Supervisory and Teacher Education Personnel in Vocational and Technical Education," Ph.D. Dissertation, Columbus: The Ohio State University, 1970. (ED 039 369).

Agricultural Education Encyclopedia of Educational Research

Swanson, Gordon I. and Persons, Edgar. "Agricultural Education." In Robert L. Ebel (Ed.), *Encyclopedia of Educational Research.* (Fourth Edition) New York: Macmillan Co., 1969. Pp. 66-76.

Research in agricultural education during the decade of the sixties is summarized and analyzed in the latest edition of the *Encyclopedia of Educational Research.* Similar compilations of educational research are published about once each decade as a project of the American Educational Research Association.

In this edition the authors summarize research in agricultural education according to the following major headings: Organization and Administration, Studies of Agricultural Manpower, Curriculum Development, Instruction, Teacher Education, Special Emphasis Studies, Measurement and Evaluation, and International Agricultural Education. Eighty-five studies are cited. The authors are members of the faculty of the Department of Agricultural Education, University of Minnesota.

AGRICULTURAL OCCUPATIONS INTEREST SCALE

WILLIAM H. HAMILTON, Teacher Education
Purdue University

William H. Hamilton

Research with the Agricultural Occupations Interest Scale (see page 22 of the July 1968 issue of *The Agricultural Education Magazine)* has removed the instrument from experimental status. The Scale now has internal consistency data for some 1,600 persons from the seventh and eighth grade levels through those with doctoral degrees. In addition to reliability data, there are data showing typical scores for high school and junior high school students, both boys and girls. The school populations used included all members of a given grade level plus other individual classes. The size of the high schools varied from about 250 to those with enrollments of 2000 or more. The schools are located in rural and urban settings in nine of the twelve supervisory districts in Indiana.

With this additional information, vocational agricultural teachers or guidance counselors can not only measure a students interest in production agriculture, ornamental horticulture, agricultural business, agricultural mechanics, and conservation and recreation but interpret their significance in terms of educational programs. With the scores obtained the student's score may be compared to those of adults successfully employed in each field and to scores made by other high school or junior high school students.

When students score higher than seventy-five of a hundred as compared to successfully employed adults or other students, their interests suggest careful consideration of that field for occupational education. With a high degree of agreement in likes and dislikes with those in an occupation, the student should find himself at home in the occupational environment. The scores of high school and junior high school students have been charted on percentile profile sheets for ease of visibility and interpretation.

Copies of the "Agricultural Occupations Interest Scale" and the percentile profile sheets for interpreting scores are available from Dr. William H. Hamilton, Department of Education, Purdue University, Lafayette, Indiana 47907.

Review of Research Reveals . . .

Some Observations About Agricultural Education

JOHN H. RODGERS and EARL T. CARPENTER
Clemson University

John H. Rodgers

Earl T. Carpenter

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Today's rapidly changing society affects every aspect of agricultural education. New problems arise faster than solutions to old ones are found. Fortunately, research in agricultural education is rapidly expanding. Over a thousand reports published between 1965 and 1969 were examined in preparing the Second Edition of *Review and Synthesis of Research in Agricultural Education* which is published by the Center for Vocational and Technical Education, The Ohio State University. The following remarks summarize observations we consider most significant.

Manpower Needs

Passage of the Vocational Education Act of 1963 gave impetus to studies of manpower needs and employment opportunities, and the results have been advantageously incorporated into programs. Also, national efforts to standardize procedures and to coordinate the collection of data have resulted in a vast factual base for program planning and curriculum development.

Many state and local studies of on- and off-farm manpower requirements have been made. In Louisiana, a battery of studies to ascertain off-farm opportunities has resulted in the availability of a great amount of useful data for educational program planning in that state.

Many manpower-requirement studies have also attempted to determine the competencies required of workers. Such information has contributed much to improving curricular content. In addition, some interesting generalizations have been stated. For example, at least one study indicates that work in agricultural production requires more intelligence than do jobs in agricultural industry. Several other ideas are supported by numerous studies:

—Employers consider skills in human relations extremely important for job security and advancement.

—Basic mathematical and linguistic competence is a more limiting factor than technical competence for entering and advancing in off-farm occupations.

—Many small off-farm businesses are unspecialized, and employees are expected to perform a wide variety of tasks.

—There is a great demand for workers capable of advancing to managerial or sales positions.

—Desirable character traits such as honesty, dependability, and initiative are of utmost importance in selecting new employees.

—In general, employers cooperate with public educational programs and are willing to arrange on-the-job training stations.

These generalizations emphasize the importance of general education as preparation for work. More important, however, is the philosophical question implied: Is not maintaining interest in school so young people may take full advantage of general educational opportunities the most important function of vocational education? If so, the recent furor over providing specific training to meet the skill and technical-knowledge requirements of the labor market will have been senseless. Perhaps students should have been encouraged to pursue their interests within the limits of their capabilities. Obviously the generalizations above also have important implications for emphasizing objectives in the affective domain.

Philosophy

Because research has contributed little to assist in establishing or modifying a basic philosophy of agricultural education, no adequate basis for evaluation exists. To determine whether the objectives of a program have been accomplished is a worthwhile though difficult task, but to determine whether those objectives were the most appropriate is more fundamental. At present, such a task is impossible.

Proficiency in farming was the goal of agricultural education from its inception. Soon after World War II, however, it became apparent that a broader objective, one encompassing off-farm aspects of agriculture, was needed. The transition from "proficiency in farming" to "proficiency in agricultural occupations," including farming, seemed logical, and the Vocation Education Acts of 1963 and 1968 legalized the change.

According to W. Howard Martin, this change is inadequate. In his 1969 address to the American Association of Teacher Educators in Agriculture at Boston, Martin stated that "much of what has gone on . . . since 1963 has failed to tune me in. It is too job oriented — too centered on needs of industry and too programmed by Big Brother."

Recognizing the need of young people for personal commitment, Martin suggested that a new, all-inclusive term broad enough to provide emphasis in agricultural production and marketing, natural resource management, environmental development, and agricultural research and service must be found. He recommended that a commission on agricultural education be formed to deal with this matter, and steps were taken at the Boston meeting for its establishment.

Job-specific education as opposed to broader-based occupational education geared to the individual needs and interests of students is the most critical issue facing vocational educators in recent times. Much has been written about the necessity of providing a basis for advancement beyond entry-level jobs. The problem is especially crucial in agricultural education where students with varied occupational objectives have learned specific agricultural skills as well as general skills in leadership and human relations.

This issue of job-specific versus student-centered occupational education becomes particularly serious when program objectives, program evaluation and the allocation of funds to vocational programs are considered. If programs are to be evaluated on the basis of how many students accept and continue in entry-level jobs, job-specific programs will fare better. Proponents of job-specific occupational education who ignore research findings are generally in power at the federal and state levels. Agricultural educators are being forced to choose between programs in keeping with their philosophy and programs that can be funded.

To date, research findings have been largely overlooked in arriving at solutions to such vital issues. Perhaps these problems do not lend themselves readily to attack by the research method. Knowledge of how students of different types of programs fare could be of great value. It is also important to find out if this issue is affected by varying characteristics of students and jobs. Certainly, the job-specific orientation currently in vogue is refuted by research on career development.

Teacher Education

Supervised teaching has been established as a pre-employment experience of benefit to teachers. The supervising teacher is a key individual influencing prospective teachers. As obvious as these facts are, little has been done to use them in improving teacher education.

Supervising teachers should be the target group for the most effective in-service education programs that can be devised, and they should be made aware of new instructional techniques, materials, media, and issues in education. The potential of this group is so great that every effort should be made to prepare them fully, and both increased status and financial incentive should be their rewards. If adequate training of supervisory teachers has occurred in any state, it is not evident from the literature. It is obvious that this area is wide open for research and development.

A need for research to improve other aspects of teacher preparation is also evident. New and exciting methods such as microteaching, the use of single-concept films to illustrate specific teaching techniques, and the provision of teaching experiences throughout the undergraduate program are being tried. Controlled research on the effectiveness of these and other new techniques must be made available.

Emerging Trends

New directions in a variety of occupational programs are being offered at the high school and post-high school levels. Not only is special attention being given to disadvantaged and handicapped students, but the ever-changing technology of agricultural production requires new approaches to preparing all enrolled students for agricultural occupations. The need for research is great.

The greatest area of need is in curriculum development. New curricula must accommodate individual differences of students. Performance standards (behavioral objectives) must be established for many courses, and appropriate learning activities and materials must be prepared for each. Guidelines to encourage wide adoption of directed work-study programs must be developed, and lists of facilities, equipment, and supplies must be prepared. Finally, provision must be made for keeping these materials up to date.

Providing a Structure

Improving coordination and articulation of the research effort in agricultural education could greatly increase the impact of the small but growing group of professional researchers. Much of the research is still conducted by graduate students in master's programs. The results of these studies are often quite useful. Improving graduate programs would probably result in even more reliable results.

Still, it is necessary to depend on experienced professionals in the field for well-designed, long-range projects capable of providing answers to complex problems. It is urgent that this group organize to carry out their function efficiently. As the group is still small, regional or national coordination is required to set priorities and distribute the important tasks among the researchers available.

Each institution conducting research might concentrate on one specific area of study thereby becoming highly proficient in that area. Furthermore, if all projects conducted over a period of years focused on one problem area, the value of the several studies might have an impact far exceeding the sum of their separate values. Competency studies done at Iowa State University and studies of off-farm agricultural occupations at Louisiana State University are excellent cases in point.

Research Coordinating Units located in each state are improving research activity by assisting with methodology and making necessary tools and equipment available. It is hoped all such units will eventually be established at the universities where they can contribute most to the research effort.

What is the state of research in agricultural education? It depends on which scorecard is used. Compared to research in other vocational fields, it may be considered quite good. When compared to the needs of the profession, the job has only begun.

A Two-Phased Experiment —

PREPARING STUDENTS FOR OFF-FARM OCCUPATIONS AND ASSESSING APPROACHES TO TEACHING

JAMES T. HORNER and ROLAND L. PETERSON
University of Nebraska

Thrust upon vocational educators in agriculture by the Vocational Education Act of 1963 was the broadened responsibility to prepare for any occupation requiring competencies in animal, plant or soil science, agricultural business management and marketing, or agricultural mechanics in addition to occupations in production agriculture. If the broadened purpose and expanded clientele are to be served, it is imperative that attention be given to determining the extent to which agricultural knowledge and skills are needed by workers in the labor force and how the knowledge and skills can best be provided. This was our attempt.

• Purposes

Many contend that work experience and related instruction are essential aspects of vocational preparation. The problem of this study was to evaluate the effects of these two factors on the preparation of high school students for entry into off-farm agricultural occupations. Also, the study compared the effectiveness of structuring agricultural subject matter around "principles" with the traditional "problems" approach of structuring subject matter. The specific purposes were to determine:

—if practical on-job experience is essential for entry into off-farm agricultural occupations,

—if courses in related instruction are essential for entry into off-farm agricultural occupations, and

—if differences exist in achievement of students taught by principles versus problems approaches.

Design for Nebraska Agricultural Education Project

Off-Farm Phase Treatment Groups	Curriculum Phase Treatment Groups: Principles Curriculum — New Schools	Principles Curriculum — Old Schools	Traditional Curriculum — Old Schools (Control Group)
	(Number of schools)		
Related Instruction	2	2	2
Work Experience	2	2	2
Related Instruction and Work Experience	2	2	2
Control	2	2	2

• Design

Twenty-four randomly selected Nebraska schools (excluding metropolitan schools) comprised the sample. Students in grades 10, 11, and 12 constituted the subjects. Sixteen of the twenty-four schools offered vocational agriculture courses prior to this study. The remaining eight schools initiated a program of vocational agriculture when the study began.

For Phase I (Off-Farm Agriculture Phase) the twenty-four schools were randomly arranged into four treatment groups: related instruction (79 students), directed work experience (47 students), a combination of related instruction and directed work experience (34 students), and a control group (151 students). The experimental design utilized was a $2 \times 2 \times 3$ analysis of covariance with repeated measures on the third factor. One factor was the presence or absence of related instruction; the second factor was labeled directed work experience; and the third factor was the year of the project. The design for the study is indicated by the accompanying table.

• Findings: Phase I

The three instruments used to determine the most effective treatment in preparing high school students for entry into off-farm agricultural occupations were the "Test on General Information for Prospective Workers," the "Work Opinion Inventory," and the "Off-Farm Agriculture Occupations Opinion Inventory."

An analysis of these three measures revealed no statistical differences among the various treatment combinations in regard to the most effective way of educating high school students for off-farm agricultural occupations. The only significant value revealed that subjects with no exposure to the

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Roland L. Peterson

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James T. Horner

Disseminating Instructional Materials

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Numerous resource units, teaching guides, and other types of instructional units are available to teachers. The agencies and institutions developing the materials assume that instructional materials are effective in improving teaching and learning. However, there is some question as to the impact the instructional materials have on students' learning.

The rationale for developing instructional materials should be adjusted to include other important factors affecting the learning process. In the study reported in this article, it was hypothesized that the method of disseminating instructional material has an effect on students' learning. The study was an experiment to evaluate the effectiveness of alternative methods of disseminating agricultural business management instructional materials to teachers of agriculture.

• Procedure

The Purdue Farm Supply Business Game provided the nucleus of the instructional material. This computer simulation model focuses attention on the decision skills pertaining to the knowledge of economics involved in the management of a retail farm supply store. The student's objectives in managing the simulated business are to increase the net worth and to increase the net operating margin of the business from quarter to quarter. A management handbook with quantitative examples derived directly from the simulation model and including suggested teaching activities was developed for teachers participating in the experiment.

The study involved 36 teachers of agriculture and 564 high school vocational agriculture students in Pennsylvania. Eighteen of the teachers were randomly assigned to receive the instructional materials in a workshop. The other eighteen teachers received the instructional materials on an individual basis in their school. Half of the teachers in each of the two distribution groups received the computer printout analysis during a visit by the project director to the teacher in his school to assist in the analysis of the first business game printout. The other half of the teachers in each of the two distribution groups relied upon their own analysis of the first computer printout without a visit from the project director.

The effects of the two methods of distributing instructional materials and the two methods of analyzing computer printouts on teachers' and students' learning was measured by multiple choice achievement tests, semantic differential attitude tests, and game net worth scores. Other descriptive data were obtained by having the teachers complete an evaluation form after teaching the unit.

• Findings

—Teachers' achievement and game net worth test scores were not significantly different between the workshop and the individual methods of disseminating instructional materials and between the printout analysis by teacher alone and the printout analysis by project director and teacher.

—Students' achievement test scores for teachers who received the instructional material on an individual basis in their school were significantly higher than students' achievement test scores for teachers who received the instructional material in a workshop.

—There was no significant difference in students' game net worth test scores between the workshop and individual distribution methods.

—Students' achievement and game net worth test scores were not significantly different between the printout analysis by teacher alone and the printout analysis by project director and teacher.

—Teachers' posttest scores on attitude toward the concepts of "price" and "computer" were significantly higher than their pretest scores.

—Students' posttest scores on attitude toward the concept of "price" were significantly higher while their scores for the concepts of "profit" and "teacher" were significantly lower than their pretest scores.

—Students' achievement test scores were significantly higher in classes: of less than fifteen students; composed of students all of one grade level; without special education students; taught by teachers less than thirty years of age;

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Donald G. Sargeant

Disseminating Instructional Materials

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and taught by teachers who supervise students in off-farm work experience programs.

- **Implications**

The Vocational Education Amendments of 1968 authorized federal funds for the development and dissemination of instructional materials for new and changing occupations. The findings of this study imply that instructional material development and dissemination should involve teachers on an individual basis in their schools. Some form of follow-up by the instructional material developing agency during the teaching of the unit should also be considered.

In this study, a follow-up visit by the project director during the teaching of the unit did not result in higher student learning. However, nearly all teachers placed five telephone calls to the project director during the teaching of the unit to report the game decisions for data processing. Therefore, the effect of the follow-up visit was neutralized in some degree because questions concerning the unit were answered during these telephone calls. This may imply that telephone calls or some other form of follow-up during the teaching of a unit may be as effective as visits to teachers in their schools.

A number of implications relative to class organization are implied by the results of the study. The agriculture class should be of less than fifteen students, all of one grade level with special education students excluded, and taught by teachers who supervise students in off-farm work experience programs if student achievement is to be the major consideration. All of these factors contributed to significantly higher achievement scores by students.

Preparing Students for Off-Farm Occupations and Assessing Approaches to Teaching

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related instruction factor scored higher on the "Work Opinion Inventory" than did those with related instruction. On all three measures, the combination group with work experience and related instruction was the lowest of the four groups; however, the differences were not statistically significant.

A follow-up job questionnaire revealed striking similarities between the off-farm agricultural occupations and the non-off-farm agricultural occupations employees in types of employment, job satisfaction, salary, and job stability. Follow-up observations revealed that after receiving instruction in any one of the four treatment groups, graduates were most frequently employed in a non-off-farm agricultural occupation. Caution is suggested since considerable variation existed in the number of students in each treatment group.

The following observations are considered meaningful. The follow-up study revealed that students in the combination work experience and related instruction group were initially employed in off-farm agricultural occupations at a higher rate than any other group. A number of teachers participating in the study believed that the combination treatment of related instruction and work experience provided students the most meaningful learning experiences. A majority of the teachers said they would implement the combination of work experience and related instruction at the close of the study.

- **Findings: Phase II**

For Phase II (Curriculum Phase) the twenty-four schools were divided into three groups: new schools with principles curriculum, old schools with principles curriculum, and old schools with traditional curriculum (see the accompanying table). The new schools had not previously offered vocational agriculture. The old schools using the principles approach consisted of eight schools which had previously offered vocational agriculture; however, the orientation of courses was changed from problem-centered to principle-centered. The old schools with a traditional curriculum served as the control group with the curriculum remaining problem-oriented for the duration of the study.

This phase was concerned with comparing two approaches to organizing and teaching agricultural subject matter. An experimental principles approach was compared with a traditional enterprise problem-solving approach. The steps in teaching via the principles approach are:

—discover the underlying principle
—reveal the principle
—plan the unit of instruction
—provide the factual information
—solve the "practical" problems in agriculture

Three agricultural achievement tests were developed to compare the effectiveness of each approach: "Test on the Principles of Plant and Animal Science," "Test on Mechanics," and "Test on Agricultural Management and Marketing Principles." The analysis indicated that the achievement of students in the principles approach was significantly greater two years out of three and no different the third year.

To assess the overall effectiveness of the curriculum phase of the study, a standardized "Agricultural Achievement Test" was developed and administered to the students who had been in one of the three treatment groups for all three years of the study. The overall analysis reinforced the finding that students taught agricultural subject matter based on the principles approach achieved significantly better than did the students taught in the traditional manner.

- **Conclusions**

—There was no most effective approach in teaching for off-farm agricultural occupations. A combination of both related instruction and work experience was most satisfying to teachers.

—Off-farm agricultural occupations courses have limited possibilities in small rural communities. A diversified occupations course may provide opportunity for more students in small communities.

—Additional teachers are needed if a school is to initiate an effective off-farm agricultural occupations education program.

—With the proper teacher preparation, high school students should be taught vocational agriculture based on the principles approach.

ARE EDUCATIONAL GAMES EFFECTIVE IN TEACHING?

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A variety of educational games have been in use for a long time, but their degree of sophistication has increased greatly in recent years. Interest in the development and utilization of educational games has also expanded rapidly.

This active interest in educational games has been ignited by rather widespread accounts of the claimed advantages of using educational games as a teaching-learning device. The values claimed for educational games are: a large amount of decision-making experience is condensed into a short period of time; there is increased interest and motivation on the part of students; educational games are more realistic than a textbook and have direct relevance to the "real world;" and games allow students to make decisions, see the effects of these decisions, and then live with these effects in making new decisions.

Hypotheses

I discovered that there was no shortage of intuitive and hypothetical support for educational games; but there was, and still is, a real need for more empirical information concerning games as a teaching device. This article reports the results of an experimental study which consisted of developing a farm management game and than experimentally evaluating what students learned as the result of playing it.

It was hypothesized that: if students are taught specific information by participation in an educational game, they will show significantly higher achievement on a posttest than students who have not played the game; if students of lower scholastic performance participate in an educational game, their achievement scores will be significantly higher than students with comparable averages in the control group; and if students play the game in groups of two or three students, then their mean achievement will be significantly higher than students who play the game individually.

The study utilized the Solomon Four-Group design and was conducted in 36 New York State high schools offering a course in farm production and management. Data were analyzed using a multiple classification analysis of variance.

Findings

I was unable to find significant differences to support the hypotheses, but students in the experimental group thought they learned more from this method of instruction and overall student interest was very high. I am convinced, based upon a questionnaire administered to students and teachers involved in the experiment, that a teacher using his own game and not restricted by the confines of a uniform experiment should be able to capitalize on this high level of student interest.

Recommendation

I highly recommend that teachers develop educational games to "beef up" their teaching. The following guidelines and procedures, based on experience gained in this study, are suggested.

Clearly state the specific educational objectives for the game. It is absolutely imperative that anyone constructing an educational game know exactly what the desired outcomes should be. This may seem like an obvious point, but it wasn't until educators started to prepare programmed instruction units that we realized our objectives were very broad and rather fuzzy. Mager's book on *Preparing Instructional Objectives* is very helpful in writing behavioral objectives.

Keep the game relatively short; no more than six decisions should be involved. Many teachers use the case study as a method of teaching. This usually involves a rather detailed look at some phase of an agricultural operation followed by a "what would you do?" type of discussion. Basically, the approach in this study was to expand upon the case study and involve the student in a series of decisions. This allows the student to observe the consequences of a previous decision and try to amplify or correct it in subsequent rounds. By continuing this process through approximately four to six decisions, the student should get a better idea of actual decision-making.

Make the rules of the game simple and easy to understand. This is probably the easiest point on which the "gaming novice" can go astray. There is a tendency to spend a great deal of

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William H. Kelly

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Costs to Students for Technical Education in Agribusiness

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University of Florida

Douglas Patterson

Douglas Patterson is Assistant Professor, Agriculture and Extension Education, University of Florida, Gainesville. This article reports one phase of his doctoral dissertation on "An Analysis of Costs and Benefits for Technical Agribusiness Education," which was completed at the University of Illinois, June 1970.

As occupational education emerges as a major facet of the educational enterprise, its development is evident in various levels of the educational system. One area in which occupational education appears to have a promising future is in junior colleges and other two-year post-high school institutions. The American Council on Education has given its support to the development of occupational education programs in the two-year colleges. In 1965, agriculture was offered in nearly one-third of the nation's junior colleges.

The two-year post-high school institution will experience extensive growth and development in the near future. The U.S. Office of Education has estimated that 500 new junior colleges will be started in the United States within the next ten years. Occupational programs in agriculture will multiply with the developing junior colleges.

Analysis of Economic Factors

Many high school graduates seeking employment in agricultural business occupations will have an opportunity to make a choice between seeking immediate employment or enrolling in post-high school occupational education. The high school graduates need objective, quantitative information on which they can base realistic expectations and make wise educational choices.

To plan or revise post-high school agricultural occupational programs, educators need objective evaluations of existing programs. A basic need in the evaluation of existing agribusiness education programs is an analysis of the economic aspects of the programs as they affect the student.

A study was designed to analyze the economic factors of the post-secondary agribusiness educational programs in Illinois. The major focus of the study was to analyze the cost to students for technical agribusiness education.

The study concentrated on graduates of post-secondary agriculture mechanics programs and agricultural supply sales-and-service programs. A survey instrument was designed and mailed to 103 graduates of the agribusiness programs who were employed in agribusiness occupations.

The private costs for technical education in agribusiness were calculated for the 97 junior college graduates who participated in the study. Cost estimates were calculated on the basis of the types of occupational programs in which the junior college graduates were prepared. Forty-nine of the participants received technical preparation for agricultural supply occupations; forty-eight of the participants received technical preparation for agricultural mechanics occupations.

Public or social costs were not analyzed in this study. Only costs incurred by a student for his technical agriculture education in the junior college which he attended were analyzed. The analysis included estimating foregone income, estimating cash outlay by the student, and determining the amount of income received by the student while enrolled.

Length of enrollment was calculated as the number of months from initial enrollment to graduation. The mean number of months of enrollment for students was 21.5 months.

Income Earned

Technical agricultural graduates estimated the income they earned while enrolled in the technical agriculture programs. The mean income earned by students while enrolled in technical agricultural programs was $2,312. All graduates of the technical agriculture programs surveyed received an income while in the supervised occupational experience phase of the technical education program. Supervised occupational experience is a required part of the technical agriculture program in each of the junior colleges contacted.

Income Foregone

Data obtained from employees who had received no post-secondary education were used in estimating the amount of income foregone by students enrolled in programs of technical agricultural education. An average monthly income of $461 was calculated for agricultural employees with no post-secondary education during the first twenty-two months of employment.

An estimate of the total potential income of technical agricultural students for the enrollment period was calculated by multiplying the average monthly income of agribusiness employees who had received no post-secondary education by the average number of months of enrollment in the technical agriculture program. The estimated potential income of technical agricultural students for the total enrollment period in the technical program was calculated to be approximately $10,000.

The estimated foregone income for the technical program enrollment period was calculated by obtaining the difference between the estimated potential income and the actual income earned. The estimated foregone income for technical agricultural enrollees was approximately $7,775.

Scholarships

Some of the technical agriculture students received financial assistance in the form of scholarships while enrolled in the technical education programs. Data indicated that 22 percent of the technical agricultural supply graduates and 32 percent of the technical agricultural mechanics graduates received scholarships while enrolled in the technical education programs. The mean value of the scholarships received by the technical agricultural supply students was $1,277. The mean value of the scholarships received by the technical agricultural mechanics students was $1,670.

An average scholarship value for each student was calculated for the technical agricultural students. These average values were used in estimating student costs for the technical agricultural education. The value of schalorship assistance for each student was obtained by multiplying the percentage of students receiving scholarships by the average value of the scholarships. A mean value of $281 was obtained for the students in technical agricultural supply programs. A value of $534 was obtained for the students in the technical agricultural mechanics programs.

Cash Outlay

Estimates of the required cash outlays for students in technical agribusiness programs were made by the agricultural instructors in five of the post-secondary institutions surveyed. Data indicate the estimated cash outlay for students varied from $407 to $800 for two years of technical agribusiness education. The estimated cash outlay included tuition, fees and books. The over-all mean estimate of cash outlay for the students was $643.

Total Costs

The direct costs to students were estimated by calculating the difference in estimated cash outlay and the average scholarship assistance. Cash outlay was estimated by junior college instructors to be approximately equal for students in technical agricultural supply and agricultural mechanics programs. The estimated direct cost was calculated to be $362 for agricultural supply students and $109 for agricultural mechanics students.

The total costs to students for two years of post-secondary technical education were calculated by combining estimated foregone income and estimated direct costs. Total costs to the students were calculated to be $7,781 for agricultural supply students and $8,343 for agricultural mechanics students.

Summary

The costs of additional education must be given serious consideration by the high school graduate contemplating entering an agribusiness occupation. In analyzing the costs of education, consideration should be given to potential income for the enrollment period as well as cash outlay for fees, books and supplies. Consideration should also be given for renumerations in the form of salary for part-time employment and scholarships.

Cash outlay requirements may vary among programs as well as among institutions. In many programs, substantial income may be earned during the on-job-training phase of the program. Estimated potential income during the enrollment period varied widely among occupations. Approximately one-fourth of the students may be able to secure scholarships for technical agricultural education.

The length of enrollment is the major factor in calculating costs to students for technical education. The costs to students for two-years of technical agribusiness education in this study was approximately $8,000.

Are Educational Games Effective in Teaching?

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time and energy formulating the rules of the game and unnecessarily complicating the game. If the rules are too complicated, the learning that takes place is figuring out "how to beat the system" rather than what is desired to be learned.

Utilize role-playing in the format of the game. Most educational games are only effective if the participants can project themselves into the simulated situations. The desired goal is that students think in terms of the simulated situation in the first person. Role playing also provides an excellent opportunity to teach attitudes; it puts an individual "in the other fellow's shoes."

Use of critique at the completion of each round to "solidify" the knowledge gained. It must be kept in mind that a basic decision-making game will involve alternative choices and therefore some students will select poor or wrong choices. A short critique after each round will demonstrate to each student why a particular choice was good or bad. A student should not be allowed to change his decision at this point, but at least he will have learned additional information to be applied during the next round.

Teacher's Role

Throughout the game the teacher should act as a coordinator and interpreter of the rules. One of the advantages of educational games is that the teacher is no longer the sole judge of when a situation is correct or incorrect. If the game is properly structured, the correctness of a student's decision will be readily apparent in the subsequent round or rounds.

As with any teaching-learning technique, educational games are not a panacea for all teaching problems. There is, however, sufficient satisfactory experience to recommend their inclusion in any educator's toolkit. Teachers will need to experiment to determine the proper use of educational games with more conventional instructional methods. A suggestion made by a teacher in the study was that games should be used as culminating experiences to "tie together" specific aspects of a unit of instruction.

Are Advantages Attributed to Area Schools Valid?

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Much emphasis is now centered on the area vocational school as a means of expanding and improving vocational education. Several states are developing vocational education programs in area vocational schools as a means of expanding vocational education for secondary school students.

Specialized vocational agriculture programs are included in the curriculums of area vocational schools. There has been much speculation about the effect area vocational school programs are having or will have on vocational agriculture programs in local schools. This study was conducted to investigate various aspects of that problem.

Procedure

From a review of literature relative to the area vocational school concept, advantages attributed to vocational programs in area vocational schools over programs in local schools were developed. From these advantages, six major hypotheses were formulated which were designed to ascertain if the advantages attributed to vocational education programs hold when vocational agriculture programs in area vocational schools are compared with vocational agriculture programs in local schools.

Two area vocational schools in Ohio and the participating local schools offering vocational agriculture in each district were purposely selected for study. Selection criteria included the length of time the area vocational schools had been in operation, geographic location, and socio-economic characteristics of the districts. Two proposed area vocational school districts, which had not yet organized an area vocational school, were selected as comparison groups for each of the two area vocational school districts. The comparison districts were selected to match as closely as possible the population, type of agriculture, and socio-economic characteristics of the area vocational school districts. Data relative to the hypotheses were obtained from 31 counselors, 448 faculty members, 31 vocational agriculture teachers, and 546 vocational agriculture students. These responses as well as data on enrollment and dropouts were obtained from two area vocational schools, ten participating local schools, and twelve non-participating local schools in the comparison districts.

Enrollment Trends

Hypothesis I. Vocational agriculture programs in area vocational schools increase the number (and percentage) of high school students studying vocational agriculture in area vocational school districts over the number (and percentage) enrolled in vocational agriculture programs in comparable areas without operating area vocational schools.

The data did not support the hypothesis. Enrollment in vocational agriculture in area vocational schools tended to increase during the first two years of operation then stabilize at a relatively constant level. Enrollment in vocational agriculture in non-participating local schools increased at a constant rate from 1965 to 1970. Enrollment in vocational agriculture as a percentage of total school enrollment was greater in non-participating local schools in comparable areas than in participating local schools during the period studied.

Enrollment trends of the schools in this study indicated that vocational agriculture programs in area vocational schools reached capacity during the first two or three years of operation and that enrollment did not increase in subsequent years. The ability of area vocational schools to fulfill the objective of providing vocational education to all who need it and can profit from it seems questionable if enrollment in area vocational schools remains constant during periods of increasing enrollments in local schools.

Specialized Instruction

Hypothesis II. Area vocational schools offer more specialized vocational agriculture programs than do local high schools.

The data tended to support the hypothesis. More specialized courses were available and more students enrolled in specialized vocational agriculture programs in area vocational school districts than in non-participating local schools in comparable areas. Teachers of specialized courses had more specialized technical preparation and more occupational experience than did vocational agriculture teachers in local schools. Vocational agriculture teachers in local schools had more professional education than did teachers in area vocational schools.

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Dropout Rates

Hypothesis III. Vocational agriculture programs in area vocational school districts have a lower percentage dropout rate than do vocational agriculture programs in high schools in areas not served by area vocational schools.

The evidence tended not to support the hypothesis. Dropout rates (including transfers to area vocational schools) from vocational agriculture as a percentage of total agriculture enrollment was higher in participating local schools than in local schools in comparable areas. This finding is tempered by the fact that agriculture program dropouts in participating local schools included all students who transferred to the area vocational school. Participating local schools had lower rates of agriculture program dropouts who also quit school than did non-participating local schools or area vocational schools.

Characteristics of Students

Hypothesis IV. Students who enroll in vocational agriculture programs in area vocational schools have distinct and identifiable characteristics which distinguish them from students who remain in vocational agriculture programs in participating local schools and from the students in non-participating local schools.

The data tended to support the hypothesis. Vocational agriculture students in area vocational schools tended to have higher current grades in all subjects; a lower percentage planned to obtain additional schooling after graduation, but a higher proportion planned to do so in agriculture; and more of their fathers were classified as laborers than were the fathers of vocational agriculture students in participating and non-participating local schools.

Vocational agriculture students in area vocational schools who desired to do so were able to participate in FFA in participating local schools or in area vocational schools. The total percentage of vocational agriculture students in area vocational schools who were members of the FFA was substantially less than the percentage of vocational agriculture students in participating and non-participating local schools who were members of the FFA.

Vocational Guidance

Hypothesis V. A greater quantity and a better quality of vocational guidance are provided students enrolled in vocational agriculture in area vocational schools than are available to students in participating local schools and in local schools in areas not served by area vocational schools.

The data partly supported the hypothesis. There were lower counselor-student ratios in area vocational schools than in participating and non-participating local schools. Vocational agriculture teachers and supervisors in area vocational schools tended to rate the extent to which counselors performed certain tasks higher than did vocational agriculture teachers in participating and non-participating local schools.

Based on counselors' responses indicating the relative time spent on various guidance and counseling tasks, counselors in area vocational schools were spending as much time counseling students relative to educational opportunities and college placement as they spent counseling students about occupational opportunities. They were also spending more time performing placement services and less time performing follow-up and evaluation tasks than were counselors in participating and non-participating local schools.

Image

Hypothesis VI. The image of vocational agriculture is rated higher by faculty members and vocational agriculture students in area vocational schools and participating local schools than by faculty members and vocational agriculture students in non-participating local schools.

The data partly supported the hypothesis. Faculty members in area vocational schools generally rated vocational agriculture higher than did faculty members in participating local schools. Faculty members in participating local schools, however, tended to rate vocational agriculture slightly lower than faculty members in non-participating local schools.

Vocational agriculture students in area vocational schools and participating local schools had a higher image of vocational agriculture than did vocational agriculture students in non-participating local schools. Vocational agriculture students in non-participating local schools rated college preparatory education higher than did vocational agriculture students in area vocational schools and participating local schools.

Some Recommendations

The specific types of schools included in the study should be taken into account when considering the general applicability of the findings. Based upon the findings of the study, the following recommendations are suggested.

—If coordination, cooperation, and consultation between vocational agriculture programs in area vocational schools and participating local schools are to be expected, it is essential that vocational agriculture teachers in local schools be involved in planning and developing programs in area schools.

—Special efforts must be made by school officials in area vocational schools and participating local schools to insure that all students who desire to do so have the opportunity to participate in extra-curricular activities in their home schools. If the students are to be considered members of the local schools, they must be included and involved in local school activities.

—Special efforts should be made by vocational agriculture teachers and supervisors in area vocational schools and participating local schools to coordinate FFA activities to insure that all students who desire to do so are able to participate. This might include an area vocational school district FFA organization.

—Follow-up studies of vocational agriculture students in area vocational schools must be conducted continuously to determine if pre-graduation plans are being followed and to provide data needed for planning and replanning of vocational agriculture programs throughout the area vocational school district.

—Counselors in area vocational schools need to expand and improve occupational career information services more in proportion to the needs of the students. The major role of counselors in area vocational schools should be that of providing vocational and occupation guidance and counseling services.

Input-Output Relationships for Adult Farm Management Programs

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What factors account for variation in output among programs for adult farm management education? One cannot fail to agree that the answer to this question has implications for decisions made by teachers and administrators in planning, operating, and evaluating these programs.

If educational programs of the same type differ in their output, the logical question which follows is "In what significant ways do the programs differ?" This study looked at the inputs into the adult farm management programs in Minnesota as the potential source of variation in their output.

Production Function Approach

The adult farm management programs were viewed as productive units having certain inputs moving through a process and resulting in an identifiable output. This is a production function approach, a concept common to economics and industry but relatively new to education. The approach requires the identification of inputs and outputs of a given process. A production function mathematically defines the relationship between process inputs and outputs and between inputs themselves. It has the potential to answer objectively this question: How should changes be made in inputs to most effectively increase output?

However, as an in-depth approach to providing this answer for educational systems, the production function approach is still in its introductory stages. Before its application for a given educational system can proceed and reach its full value, the educational system's inputs and outputs must be identified in quantified form and a data bank must be established to provide information on the inputs and outputs as defined. The study reported in this article attacks the problem of identifying the important inputs to the adult farm management program in Minnesota and the application of the production function approach to this program.

Program Inputs

Inputs into the adult farm management program were divided into educational and non-educational categories. The educational inputs were subdivided into groups related to quantity and quality. Educational quantity-related inputs referred to those inputs associated with the amount or intensity of education during a given cycle through the farm management program. The quantity-related inputs were number of farm families enrolled, percentage of classroom instructional time spent in farm management instruction, average number of farm visits per family, number of contact hours of farm management instruction per family enrolled, and total hours of instruction per family enrolled.

Educational quality-related inputs referred to those inputs commonly associated with the excellence of instruction. The quality-related inputs were instructor's salary per family enrolled, instructor's travel and subsistance per family enrolled, percentage of families enrolled who complete a record analysis, instructor's years of vocational agriculture teaching experience, age of agricultural classroom, and instruetor's educational level.

The noneducational inputs were also divided into two categories: participant-related and noneducational environment-related inputs. The participant-related inputs refer to those inputs which the farm family brought with them when entering and which they retained during the farm management program. The value of a participant-related input variable for a given program was the mean on the input variable for participants in the program. Examples of the inputs in this category are mean total farm capital, mean total liabilities, mean work units per worker, and mean years of previous farm record analysis.

The noneducational environment-inputs are made up of those environmental inputs not provided by the farm management program. The inputs fitting into this category were annual precipitation, number of frost free days, and a soil productivity index. These measured the general productivity level of the farms within the area served by each program since they are primary factors determining crop selection, crop yields, livestock enterprise combinations, and cropping program risk.

Program Output

The selected output measure for an adult farm management program was mean labor earnings for participants. On an individual participant basis, labor earnings is equal to total farm receipts minus total farm expenses.

Mean labor earnings was selected as a feasible measure of output using three selection criteria. First, mean labor earnings as a monetary measure was quantifiable. Second, it was a valid measure from both a farm family and instructional perspective in that a major objective of the farm management program was to increase the income of its participants. One factor which enhanced the validity of the mean labor earnings measure was that farmers are self employed and, therefore, their incomes are not directly constrained by wage regulations or labor practices as found in other occupations. This factor allowed mean labor earnings to be more reflective of the inputs, both educational and noneducational, which produced it. The third selection criterion was reliability. Reliability refers to consistency of the measurement. Mean farm income for participants within a given farm management program had many sources of variance. To increase the reliability of mean labor earnings as an output measure, a minimum number of participants was required in the program before it was considered in the study.

It was recognized that there were other less tangible outputs of the farm management program which may or may not be highly correlated with mean labor earnings. However, using the criteria indicated mean labor earnings was selected as the most feasible output measure.

Analysis

The adult farm management program was investigated for the year 1967. Thirty-two programs were included in the analysis. Each of these programs had ten or more farmers enrolled. The programs were distributed throughout the state of Minnesota.

Correlation and stepwise multiple linear regression techniques were used to identify the most important program inputs. The criterion of importance of a particular input was its statistical ability to account for variation in output between adult farm management programs.

Seven input variables proved to be most important in predicting program output. These inputs were mean index of crop yield (a measure of crop yield), mean index of return per $100 feed fed (a measure of livestock efficiency), number of frost free days, number of visits per family, percentage of classroom instructional time spent in farm management instruction, age of agricultural classroom, and instructor's salary per family enrolled. The last three input variables listed had negative regression coefficients.

Findings and Implications

One of the major objectives of this study was to identify the most important inputs accounting for variation in output of adult farm management programs in Minnesota. The seven variables identified accounted for 73.6 percent of this variation. However, all results must be kept in perspective by tempering them with three limitations: only one year's operation was investigated, only the between program variation was investigated, and correlation-regression analysis does not establish a cause and effect relationship.

The analysis revealed that the participant-related inputs—mean index of crop yield and mean feed index — alone accounted for 60.6 percent of the between program variance from the total of 73.6 percent with all seven inputs. Only 13 percent more variance was accounted for by the noneducational environment-related input, number of frost free days, and the educational inputs. This finding implies that noneducational inputs, especially those related to the participant, explain a much larger share of the variation in output among farm management programs than do the educational inputs. If this is true, it becomes important to take account of the noneducational inputs when comparing the productivity of various programs where income is used as the measure of program output.

Referring to the seven inputs identified, the participant-related inputs — mean index of crop yield and mean index of return per $100 of feed fed — were efficiency measures on the farm families in a given program. Since methods of increasing efficiency were one of the major areas of emphasis in the farm management program's curriculum, these input variables may have been confounded with the educational input variables. That is, these efficiency measures may have statistically accounted for variation in output between program which was actually due to the educational inputs.

The educational inputs accounted for a much smaller portion of the variation than the participant-related inputs; however, approximately 26 percent of the total variation was still unaccounted for. There are at least two implications here: educational inputs account for a relatively small amount of the difference in output between programs, or the most important educational inputs were not measured.

Number of farm visits per family enrolled and age of agriculture classroom, a proxy measure of a community's capital investment in its agricultural program, were related to the program output measure in the direction expected. The positive relationship of number of farm visits per family enrolled implied that programs with more on-farm visits also had higher mean labor earnings. The negative regression coefficient for the variable age of agriculture classroom indicated that older agricultural classrooms were associated with programs having smaller output.

The negative regression coefficients for percentage of instructional time spent in farm management instruction and instructor's salary per family enrolled were more difficult to explain. Perhaps the negative relationship of instructional time spent in farm management instruction resulted from instructors spending more time at management instruction in programs enrolling farm families with small labor earnings. There were several potential reasons for the negative coefficient for instructor's salary per family enrolled, however, each needed more investigation before a valid explanation could be interpreted.

George H. Copa is Assistant Professor, Department of Agricultural Education, University of Minnesota, St. Paul. This article is taken from his Ph.D. dissertation, "Identifying Educational System Inputs Towards Production Function Application in Education," which was completed at the University of Minnesota, July 1970.

George H. Copa

The Relationship of Teachers' Knowledge to Students' Achievement

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and
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What is the relationship between a teacher's knowledge of subject matter and level of students' achievement? Do students whose vocational agriculture instructors possess a high level of knowledge of specific subject matter achieve at higher levels than do students whose instructors possess low levels of knowledge of the subject matter? Do teachers increase their knowledge of subject matter as they teach and does this change have an effect on student achievement? What is the relationship between a teacher's knowledge of subject matter and students' achievement when different instructional approaches and media are used?

THE STUDY

In an attempt to provide answers to those questions, a random sample of 48 Iowa vocational agriculture instructors and their students was selected. Each instructor and his students were randomly assigned to one of eight treatment groups: audio-tutorial, demonstration, field trip, prepared lesson plan, single concept film, transparency, video-tape, and a control group with teaching in the traditional manner. Included in the study were 2,503 vocational agriculture students in grades 9 through 12.

Subject matter included in the study was that which would be typically taught in each of the grade levels studied. Units of instruction were animal health, commercial fertilizers, small gasoline engines, and farm credit.

An objective pretest and posttest was developed for each of the instructional units and administered to students in each of the classes by the school guidance director. Likewise, a test over each of the subject matter areas was developed for instructors and administered to them by the guidance directors before and at the end of the study. Instructors were placed in three equal-sized groups (high, medium, and low) based on their pretest scores and differences between pretest and posttest scores. The study covered a period of three weeks.

FINDINGS

Students' Achievement and Instructors' Knowledge

Data presented in Table 1 reveal the differences between the mean pretest and posttest scores for students grouped according to instructors' knowledge of the subject matter. In three of the five subject matter areas, students whose instructors were in the medium group had the greatest difference between pretest and posttest mean scores. In all but the small gasoline engines subject matter areas, students whose instructors were in the low group had the lowest mean score differences. In the small gasoline engines area, students whose instructors were in the low group had the greatest difference between mean pretest and posttest scores.

Analysis of variance was used to test for significant differences among instructor groups in each of the subject matter areas. No significant differences among groups were observed for the animal health, commercial fertilizer, small gasoline engines, and farm credit units. Differences among instructor groups, however, for the composite subject matter were significant at the 0.05 level of confidence. To determine where the differences occurred among instructor groups in the composite subject matter, t-values were calculated for the three comparisons. The results of these tests are presented below. Significant differences existed between the high and low and between the medium and low instructor groups.

Instructor Groups Compared	t-value
High and medium	.38
High and low	3.22*
Medium and low	3.27*

*Significant at the .01 level of confidence

Instructors' Change in Knowledge

Instructors' mean pretest and posttest scores were analyzed to determine if there were significant differences between the instructor groups' pretest and posttest scores (Table 2). In all subject-matter areas, the posttest mean scores were higher than the pretest scores. A t-test was used to determine if the differences between instructors' pretest and posttest scores were significant. All mean score differences were statistically significant.

Students' Achievement and Instructors' Change in Knowledge

Differences were observed among the posttest scores of students grouped according to their instructors' change in knowledge of subject matter. The differences in posttest scores among students grouped according to their instructors' change in knowledge were not significant for composite subject matter, animal health, commercial fertilizer, and farm credit. In the small gasoline engines unit, however, there was a significant difference (at the .05 level) in posttest mean scores among students grouped according to their instructors' change in knowledge. The highest mean score in small gasoline engines was made by students whose instructors were in the low instructor group.

Danial C. Beane

Alan A. Kahler

This article is based on Mr. Beane's M.S. thesis, "Experimental Evaluation of Student Achievement in Vocational Agriculture Based on Instructors Knowledge and Media Used." This article is Journal Paper No. J-6656 of the Iowa Agriculture and Home Economics Experiment Station, Ames, Projects No. 1732 and 1733.

Table 1

Differences in Students' Pretest and Posttest Scores Grouped According to Instructors' Knowledge of Subject Matter

Subject Matter Area	Instructor Group		
	High	Medium	Low
	(Mean difference)		
Animal health	11.22	11.31	10.02
Commercial fertilizer	8.58	9.65	8.68
Small gasoline engines	12.81	12.25	13.28
Farm credit	9.96	8.01	7.91
Composite subject matter	10.69	11.27	8.28

Table 2

Differences in Instructors' Mean Pretest and Posttest Scores

Subject Matter Area	Pretest and Posttest Mean Difference	t-value
Animal health	+3.1	4.09*
Commerical fertilizer	+2.8	2.98**
Small gasoline engines	+4.7	5.39*
Farm credit	+1.7	2.77**
Composite subject matter	+3.3	2.84*

*Significant at the .001 level of confidence
**Significant at the .01 level of confidence

Student Achievement, Instructor Knowledge, and Media Used

The data revealed differences among students' scores grouped according to their instructors' knowledge of the subject matter and the form of instructional media used. In some instructor knowledge groups students using other media had the highest scores. When these scores were tested by analysis of variance, nonsignificant interaction F-values were derived, revealing that there was no significant interaction between instructors' knowledge and instructional media used to teach the unit.

CONCLUSIONS AND RECOMMENDATIONS

The findings of this study suggest that teacher education programs for prospective teachers of vocational agriculture should be evaluated to make certain that they provide educational opportunities in all areas of technical agriculture and methodology. Consideration should be focused on the emphasis that these programs place on problems teachers encounter in teaching.

Based on evidence provided in this investigation, it was concluded that teacher education programs for prospective teachers should be flexible allowing advisers and university students the opportunity to plan programs that will meet the needs of the prospective teacher. In doing so, the strengths and weaknesses of the student in both the technical and pedagogical areas can be considered and the best program developed for the student.

The fact that no differences were observed by instructor group when different media were used suggest that more emphasis be given the study of methods of teaching in the undergraduate and graduate agricultural education programs. In the main, this emphasis should be placed on special methods of teaching vocational agriculture. Included in the study of methods should be laboratory classes that require the prospective teacher to prepare and teach lessons in specific technical areas of agriculture.

To develop further the prospective teachers' ability to use these methods, more time should be spent in student teaching. Working longer with the cooperating teacher will aid student teachers in becoming familiar with teaching methods and techniques that lead to effective teaching and learning. Identifying methods and techniques that are most effective and which allow student teachers to experience success in their use will stimulate student teachers to try other methods and techniques in teaching.

The fact that the vocational agriculture teachers in this study increased their understanding of the subject matter as they taught it provides yet another recommendation. Inservice education programs for vocational agriculture teachers should be greatly expanded. Workshops, institutes, and off-campus courses in both the technical agriculture and pedagogical areas should be conducted for vocational agriculture teachers to up-date their understanding of the technical materials that they teach and their ability to teach it. Subject matter specialists should be employed at the university level with their full energies devoted to working with vocational agriculture teachers.

Concerns and Expectations of Area Occupational Education Programs

JOHN R. CRUNKILTON, Virginia Polytechnic Institute
and
JOE P. BAIL, Cornell University

The possibility that area vocational schools would develop in many states is now past. They have now become a reality. The time has come to lay aside arguments for and against area vocational schools and devote time and effort to conducting successful programs in area centers.

Many of the educational values that an agricultural education program can provide communities within an area school's boundary were pointed out in the February, 1969, issue of *The Agricultural Education Magazine*. We cannot afford the development of haphazard agricultural education programs in area schools or permit others to develop our programs and then tell us how to conduct them.

PROGRAM DEVELOPMENT

Before we find ourselves spending time treating problems arising from hastily developed programs, attention should be focused upon positive program development. We can therefore prevent some problems experienced in area schools in the formative stages. One approach is to answer this question: What are the current concerns and expectations of lay and professional people regarding occupational education in area schools?

A study was initiated in 1968 at Cornell University in cooperation with the New York State Education Department to research this problem. The study was broad in scope, encompassing all the occupational programs offered in area schools in a twelve-county area in New York. The findings of this study have strong implications for agricultural education programs in area schools.

To identify the concerns, expectations, and degree of expectation fulfillment of those associated with area programs, samples of 79 students attending area schools, 72 parents of students, 71 occupational teachers, 73 administrators and guidance counselors, 77 school board members, and 67 potential employers were contacted in eight area school districts to provide the necessary data. The conclusions drawn from this study served as a basis for the development of 27 guidelines for use in strengthening present and future area occupational education programs. This article presents these guidelines and several of the major findings and conclusions of the study.

CONTINUING EDUCATION

The emphasis upon continuing education prompted the question to students regarding their plans for further education. Thirty-five per cent of the students had no plans for further education; 3 per cent planned to attend a four-year college; 30 per cent planned to enter a two-year community college or technical school; 27 per cent planned to pursue apprentice, night school programs, or to continue similar training in the military service; 5 per cent did not respond to the question. The fact that more than 50 per cent of the students plan to continue formal education is significant.

These findings imply that any occupational program must be closely aligned with job opportunities in the labor market and that programs must be articulated with course offerings in the two-year community college or technical school. Unless we in agricultural education consider this in program development, students will be limited in their ability to secure employment or continue their education.

CONCERNS AND EXPECTATIONS

Two major objectives of this study were to identify concerns and expectations which lay and professional groups have with area occupational education programs. Each of the respondents was asked to indicate on the questionnaire whether a statement reflected a concern of his with the area program. If the statement was a concern, respondents were then asked to indicate whether it was a major or minor concern. The following are statements which were indicated as a major concern by 50 per cent or more of each respondent group.

Students

—Whether a student will be prepared to enter a job at an entry level upon completion of the program.

—Whether the area occupational center will help graduates find jobs.

John R. Crunkilton

Joe P. Bail

John R. Crunkilton is Assistant Professor of Agricultural Education, Virginia Polytechnic Institute. Joe P. Bail is Professor and Chairman, Division of Agricultural Education, Cornell University. *A copy of the study reported in this article, "Area Occupational Education Programs in a Selected Twelve County Area in New York: Concerns and Expectations," may be obtained from the Division of Agricultural Education, Cornell University, Ithaca, New York 14850.*

GUIDELINES FOR THE DEVELOPMENT OF AREA OCCUPATIONAL EDUCATION PROGRAMS

General

—Occupational education programs should reflect the current and projected manpower needs in local, regional, and interstate areas.

—Occupational education should be available to all who are interested and can profit from the instruction offered, including school-age youth and adults.

—Occupational education programs should be designed to meet the special needs of individuals with physical, social, or other handicaps.

—Occupational education programs must provide training which is satisfactory for employment at specific entry level positions.

—A functioning advisory board must be established to provide counsel regarding course offerings, course content, opportunity for cooperative endeavor with business and industry, and assist in evaluation of various facets of the program.

—A planned public information program must be in continuous operation if the lay public is to properly comprehend the scope and contributions of the program.

Administration

—Cooperative effort and spirit is necessary among all administrations if students' needs are to be paramount.

—The area occupational program must be closely meshed as a part of the comprehensive high school program.

—Agreement on administrative matters regarding school schedules, length of class periods, and grading systems must be reached if the occupational education program is to be attuned to all schools in the area.

—A systematic approach to communication with all involved professional staff must be developed.

—Administrations must take responsibility for coordinating course offerings with community colleges or other two-year colleges or institutes in the area.

—Students enrolled in occupational education programs in area centers must be provided full opportunity to participate in activities in their local schools.

Guidance

—An adequate guidance staff must be provided if proper selection, assignment, and follow-up of occupational students is to become a reality.

—The area center guidance director must be willing to organize a systematic program for acquainting local school guidance staffs with the total program at the occupational center.

—Local guidance staffs must familiarize themselves with the curricular offerings and facilities in the area center.

—Placement of graduates in jobs must be a joint responsibility of the area guidance director and the teacher(s) in the occupational subject.

—Guidance staffs of component schools should be involved in evaluation and follow-up of graduates of the occupational education programs.

—Guidance staffs must be knowledgeable about the businesses and industries in which occupational education students seek employment.

Curriculum

—Occupational programs must be continually up-dated and revised in keeping with the latest technological developments.

—Students in occupational education programs should be expected to develop desirable work habits and attitudes.

—Facilities, equipment, and instructional content must reflect the actual occupations for which students are training.

Directed work-experience should be provided as a part of or in addition to the regular class and laboratory experiences.

—Teachers must be provided with opportunities for in-service education both of a formal and informal nature.

—When the size of programs dictate, a coordinator for each occupational area (Agriculture, Business and Office, Distribution, Home Economics, and Trades and Industry) should be appointed. This will be especially important in the future as programs expand and if good communications are to result.

—Special courses must be designed to meet the needs of disadvantaged individuals.

—Youth organizations can contribute meaningful citizenship experiences for students in occupational education programs.

—Flexibility and adaptability should be the keynote in program planning. Students should be able to progress to their level whether it involves the total program or only a portion of that program.

—Opportunities for job placement after program completion.

Parents

—Whether a student will be prepared to enter a job at an entry level upon completion of the program.

—Provision of accident insurance coverage of students while attending the area occupational center.

—Whether the area occupational center will help graduates find jobs.

—Opportunities for job placement after program completion.

—Availability of work experience programs.

—Not enough emphasis placed on occupational education programs.

—Adequacy of guidance counseling for prospective occupational education students.

Board Members

—Cost of operating the occupational programs.

Teachers

—Attitude of component school guidance counselor toward the area occupational program.

—Adequacy of guidance counseling for prospective occupational education students.

Administrators and Guidance Counselors

—Why students drop out of the area occupational education programs.

Potential Employers

—The use of staff with insufficient training to teach students with special needs.

—Whether a student will be prepared to enter a job at an entry level upon completion of the program.

—Type of training experiences being offered.

—Ability to obtain qualified teachers.

—Not enough emphasis placed on occupational education programs.

—The quality of students entering the occupational education programs.

Less than half of every sample group expected that occupational education be provided only at the eleventh- and twelfth-year level. Five statements ranked consistently high as expectations of area occupational programs. These statements were: that occupational programs meet the employment needs of the students; that occupational programs meet the needs of the employers for entry level workers; that local administrators and area administrators have regular lines of communication established; that guidance programs of component schools and area centers be coordinated; and that area centers have available modern, adequate facilities and equipment.

Using a three-point scale, the fulfillment of the respondents' expectations were determined. Parents indicated a higher level of fulfillment than

(Continued on page 129)

The Role of the Vocational Agriculture Teacher

LEWIS C. FORREST
North Carolina State University

Considerable concern has been expressed over the changing role of the vocational agriculture teacher. This article reports part of a study that attempted to deal with the question: In what behaviors should vocational agriculture teachers engage?

The Study

A questionnaire was developed which included thirty activities in which teachers might engage. Respondents were asked to indicate whether they felt that vocational agriculture teachers should or should not engage in each activity.

There were seven groups of respondents: vocational agriculture teachers, vocational home economics teachers, distributive education teachers, trade and industrial education teachers, nonvocational teachers, principals, and superintendents. One hundred randomly selected individuals from each of these groups were surveyed during the spring of 1967. Eighty-five per cent of the questionnaires were returned. Participants were equally divided among the states of Florida, Georgia, Kentucky, and North Carolina.

The study was undertaken on the assumption that an analysis of this nature would be of value to those who are presently concerned with teacher education and supervisory responsibilities. The study is an attempt to clarify further the role of the vocational agriculture teacher. While much remains to be known with respect to teachers of vocational agriculture, nothing is more central than the role expectations associated with their positions. Similarly, little about vocational agriculture is as inadequately understood or subject to more speculation in view of the changes taking place in the program.

Percentage of Respondents Indicating Vocational Agriculture Teachers Should Perform Selected Activities

Role Activity	Percent
School Faculty Member	
Perform maintenance services for the rest of the school	12
Teach regular school classes outside their area of specialization	3
Participate with other teachers in implementing new instructional methods in the public school program	98
Teaching and Learning	
Provide instruction in school that easily relates to occupations in the subject area	99
Provide instruction based upon the expressed goals and objectives of students	88
Teach by the textbook and cover as much material as possible during the school year	11
Teacher-Student Relationships	
Know the parents of each student	92
Visit students at their homes	91
Help students plan informal activities to occur beyond school hours and school facilities	77
Adult Education	
Utilize school time and school facilities for providing instruction for adults who are established in occupations	40
Visit adults on their jobs and provide requested instruction or suggestions for improving their occupational situation	66
Provide individualized help to adults in the community concerning educational problems	74
Youth Organizations	
Provide leadership training for prospective leaders in the community through youth organizations	93
Involve out-of-school citizens in activities of youth organizations	84
Serve as advisor to youth organizations in the school	92
Local Educational Planning	
Survey the community resources as a part of determining what to teach	98
Utilize records of previous years' activities and accomplishments in planning future programs	99
Involve citizen groups in planning major courses of instruction	68
Guidance and Counseling	
Provide educational and occupational information through group instruction in school	97
Utilize standardized tests in ascertaining students' abilities, interests, and needs	83
Assist the guidance counselor in maintaining up-to-date information on students in cumulative files	90
School-Community Relationships	
Appear before civic and professional community groups to discuss problems confronting the community and the school	89
Become an active member of community organizations, outside of the school	96
Be available as a consultant in the community when problems arise related to their field of specialization	93
Supervised Practice	
Provide learning experiences related to occupations for individual students beyond school facilities and school hours	91
Relate instruction to learning experiences in which students can engage outside of the school facilities on their own time	98
Encourage students to discuss in class outside learning experiences related to occupations in their field	99
Professional Self-Improvement	
Gain professional self-improvement by leaving teaching to take a job related to their teaching for a period of on-the-job experience	43
Participate in educational conferences and workshops outside of the school where they teach	97
Seek advanced college degrees	92

Findings

Presented in the table are the thirty role activities with the percentage of all respondents who felt that vocational agriculture teachers should engage in each activity. The activities are grouped according to function. In the questionnaire the group headings were not present and the activities were randomly arranged.

Note that several of the activities were not considered appropriate by a majority of respondents. Furthermore, some activities were considered very appropriate. Special attention is called to the three adult education activities. At best, adult education is considered a marginal role by the respondents.

Implications

Teacher educators and supervisors should be able to utilize the findings to better understand what teachers and administrators expect of vocational agriculture teachers. Vocational agriculture teachers should find the results helpful in understanding their own roles.

The results are one attempt to clarify further the role of the vocational agriculture teacher. Careful consideration and serious discussion should be underway to examine some of the inconclusive results, especially in areas such as adult education.

One important implication that should not be overlooked by agricultural educators is this: Teachers are influenced greatly by peers, and persons behave as they are expected to behave. Therefore, if local teachers and administrators feel that a role is inappropriate, the vocational agriculture teacher may have difficulty performing the role, even though in some cases he may feel that he should. Before teacher educators and supervisors evaluate a teacher's performance of the roles they feel are appropriate, they should try to determine the local conditions of influence under which the teacher is behaving. The agriculture teacher may no longer be able to perform some roles because of changes in expectations at the local level.

Lewis C. Forrest

Lewis C. Forrest is Instructor, Department of Agricultural Education, North Carolina State University, Raleigh. *The research reported in this article was completed pursuant to a contract with the U. S. Office of Education through the Center for Research, Development and Training in Occupational Education at North Carolina State University.*

Concerns and Expectations of Area Occupational Education Programs

(Continued from page 127)

students. Expectation fulfillments for the other respondent groups were lower and similar.

CONCLUSIONS

Concerns identified by lay and professional groups revealed that further improvement in area occupational programs can be made. The following conclusions reflect these concerns.

- Evaluation techniques specifically applicable to area occupational programs need to be developed and tried out in actual situations.
- Guidance personnel services for the area and component schools need to be expanded to fulfill its proper role in serving occupational education students.
- Occupational education course offerings must be continually up-dated to offer relevant training experiences.
- Provision for work experience programs to supplement occupational training experiences is desirable.
- Established lines of communication need to be improved between the area and component schools and between teaching staff and administrators.
- In-service educational programs for occupational teachers need to be provided and utilized.
- A systematic public information program must be developed to provide information on the area occupational program to parents and other lay people in the community served by the area center.
- Efforts must be made to maximize teacher-parent contact in an area program.
- Efforts must be made to instill a sense of dignity and worth in the occupational education program and its contribution to the education of youth and adults.
- Procedures for the selection of occupational education students need to be reviewed and occupational teachers should assume an active role in the process of selection.
- Students dropping out of the area programs should be followed up to determine reasons for their decision to leave the program.
- All potential sources of teachers must be examined by administrators if the most competent teachers are to be secured.
- Administrators must use all financial resources effectively and efficiently to obtain the greatest benefit for the funds expended.

BOOK REVIEWS

GERALD R. FULLER, Special Editor
University of Vermont

REVIEW AND SYNTHESIS OF RESEARCH IN AGRICULTURAL EDUCATION by Earl T. Carpenter and John H. Rodgers. Columbus, Ohio: The Center for Vocational and Technical Education, The Ohio State University, June 1970 (Second Edition), 83pp.

The authors' intention for preparing this review and synthesis was to produce "a document of value to teachers, school administrators, supervisory personnel and teacher educators as well as researchers." It was also intended "to serve as a convenient source for obtaining an overview of research reported during the last three years in agricultural education." More than 1,000 manuscripts were considered; approximately 500 had a direct influence on the review and are included in the bibliography.

The following major headings indicate how studies were grouped for analysis: Philosophy and Objectives; Manpower Needs and Employment Opportunities; Teacher Education; Learning Processes and Teaching Methods; Instructional Materials and Devices; Curriculum Development; Administration and Supervision; Educational Programs; Facilities and Equipment; Student Personnel Services; and Evaluation. Many of these areas were subdivided when the research warranted.

The authors have done an excellent job of fulfilling their objectives by summarizing the research in a narrative form which is extremely readable and interesting. This method of presentation very quickly acquaints the reader with significant studies in each area. The authors' conclusions and recommendations are succinctly stated at appropriate times. The findings of many studies are presented in sufficient detail, enabling the reader to determine if he wishes to read it in its entirety.

This concise review, should serve to acquaint educators in general with some of the new directions in agricultural education. It should also be an effective vehicle to demonstrate the sophistication of research and development efforts within agricultural education.

Everyone actively employed in any level of agricultural education should certainly take time to read this book as it realistically summarizes the current research situation and imaginatively, yet pragmatically, suggests needs and directions for the future.

William H. Kelly
University of Vermont

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WELDING PROCESSES by Ivan H. Griffin and Edward M. Roden. Albany, New York: Delmar Publishers, a Division of Litton Educational Publishing, Inc. (First Edition) 1970. 232 pp. $7.40.

Welding Processes includes thirty-four lessons on oxyacetylene welding; twenty lessons on arc welding; four lessons on Tig, Mig and other welding techniques; seven lessons on metallurgy; two lessons on employment opportunities; and nine project plans.

Each lesson is two to four pages in length and contains subject matter, a listing of necessary materials, an operational procedure, references, and review questions. Each lesson has illustrations or photographs. Because of the limited space per lesson a great depth of subject matter has not been covered. Additional information could be supplied by the instructor during demonstrations and discussion periods. The text would be most helpful in junior high and other classes for beginning welders.

The balance of subject matter between arc and oxyacetylene welding might be appropriate for some programs. The units on welding opportunities and metallurgy are at the end of the book.

The book is easy to read and colorful, which will increase its acceptance by many students. An instructors guide is available for use with the text for $1.00. The authors were aiming at the beginning welder. I suggest you review the book to see if they hit the target.

W. Forrest Bear
University of Minnesota

★ ★ ★

MISSION OVERSEAS, A HANDBOOK FOR U.S. FAMILIES IN DEVELOPING COUNTRIES by Harold D. Guither and W. N. Thompson. Urbana, Illinois: University of Illinois Press, 1969, 294 pp. $2.95 (paperback).

The first half of the book is devoted to the family decision to move to a developing country; the logistics and red tape necessary to get there; what to expect in the foreign country concerning housing, conveniences, domestic help, health care, schools, frustrations, and cultural differences; the advantages and disadvantages of taking an extended overseas assignment for the family and one's career; and some suggestions concerning successfully living and working in a developing country.

The second half of the book includes fact sheets about eighty-two developing (underdeveloped) countries. The fact sheets contain information about the climate, electricity, language, religion, currency, addresses of schools for American children, embassy and consulate addresses, and additional reading references.

The book is the result of a funded research project for which questionnaires from 598 university faculty members and 315 wives provided much of the material for the book. The subject is well covered. No problems concerning going to an underdeveloped country to work have been overlooked. However, generalized statements about so many countries are difficult.

The book is a must for university families who will be moving to a developing country. This is especially true if the trail has not been broken by people they know. The sources for further information are useful because they are difficult to find elsewhere.

Martin B. McMillion
University of Minnesota

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From the Book Review Editor's Desk

MIDWEST FARM HANDBOOK by the Iowa State University Staff. Ames, Iowa: Iowa State University Press (Seventh Edition) 1969, 505 pp. $6.95.

This is the seventh updating of an important encyclopedia of farm management information. It is designed for use by "farmers, county extension workers, vocational agriculture teachers, and those in agricultural businesses . . ." If you have not seen a copy, you should order one for review.

OUTBOARD MOTORS AND BOATING revised by George Uskali. Indianapolis, Indiana: Theodore Audel and Co. (Second Edition) 1969, 352 pp. $4.95.

According to the publisher, this is a fully updated edition. Every part of the outboard motor is treated and an ample number of illustrations are provided. This would be a good reference book for courses which include outboard motors in the study of gasoline engines.

Themes for Future Issues

December	***Innovations in Agricultural Education***
January	***Work Experience Programs for Agricultural Students***
February	***Placement and Follow-up of Agricultural Students***
March	***Environmental Science Education in the Agricultural Curriculum***
April	***Agricultural Education for the Disadvantaged***

News and Views of NVATA

JAMES WALL
Executive Secretary

The Twenty-Second Annual Convention of the NVATA will be held at New Orleans, Louisiana, December 5-9. The Fontainebleau has been designated as the headquarters hotel for NVATA and the Agriculture Education Division of AVA. Over 700 agricultural educators, wives, and guests are expected to register.

Three general sessions will be held. Each of the six Regions will hold two sessions to attend to items of regional concern. Regions II and IV will elect new Vice Presidents.

Featured speakers will include Dr. Lee Hardwick, Associate Commissioner, Adult, Vocational and Technical Education, U.S. Office of Education, who will speak on Saturday afternoon and Fred Stines, Publisher, *Successful Farming Magazine,* who will appear at the Sunday morning breakfast.

Sponsors of breakfasts to be held on Sunday, Monday, and Tuesday mornings will be A. O. Smith Harvestore Products, The National Conference of State Cooperative Councils, The American Institute of Cooperation, The Farm Film Foundation, The Foundation for American Agriculture. The American Institute of Cooperation and The National Rural Electric Cooperative Association will join together in sponsoring a dinner on Saturday evening for the state presidents and one other delegate from each state. The Louisiana Association will sponsor a reception for the Agricultural Education Division on Sunday afternoon following an hour of group meetings where all Division personnel will discuss evaluation procedures.

Fifteen teachers of vocational agriculture will attend the convention with all expenses paid by the New Holland Division of Sperry Rand, United States Steel Corporation, and The Charles Pfizer Company. Associations that have reached 100 percent membership in NVATA will receive special recognition as will the state presidents of the associations that have attained excellence in certain designated areas. An Exchange of Ideas Contest will be held and the twelve winners will walk away with valuable prizes. The idea must be exchanged with a teacher from outside the entrant's Region.

A new President and two new Vice Presidents will be installed at the final session.

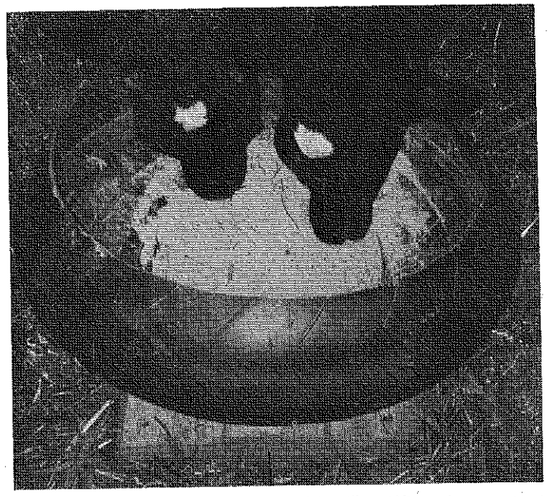
Fourth National Young Farmer Educational Institute

The Fourth National Young Farmer Educational Institute will be held in Wichita, Kansas, December 6-9, 1970. An interesting program including speeches, panels, and tours is planned for young farmers and their wives attending the institute. Teachers of agriculture, supervisors, and teacher educators are urged to attend. For information concerning the National Institute contact:

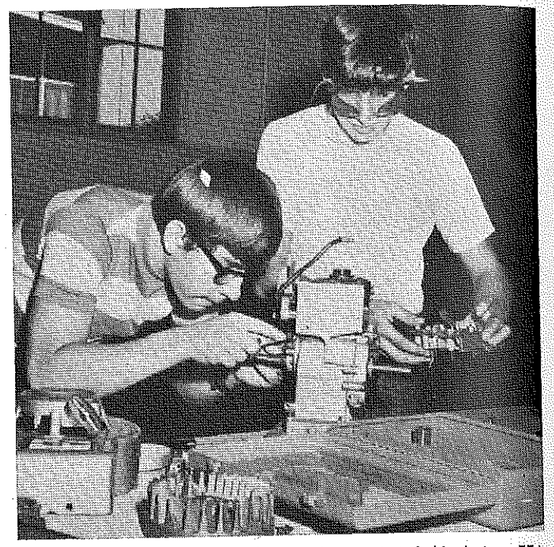
Dale Adell, Chairman
Executive Committee
Young Farmer Educational Institute
Rural Route 1
Glen Elder, Kansas 67446
Phone (913) KI5-3368

Stories in Pictures

ROBERT W. WALKER
University of Illinois



Vocational agriculture students at Mayville, Wisconsin, construct multi-purpose livestock feeders from used car tires. To build, remove one side of the tire by cutting all the way around about five inches from the bead, turn the tire inside-out and nail the resulting bowl-shape through the other bead to a platform made of two-inch lumber. (Photo by John W. Santas, Vocational Agriculture Teacher, Mayville, Wisconsin)



Contestants in the small gasoline engine contest held during FFA Week at The Pensylvania State University attempt to correct faults placed in the engines by contest officials. (Photo by Rodney W. Tulloch, The Pennsylvania State University)

Students not enrolled in the horticulture class at Cherryville (North Carolina) High School use their study period to get experience in horticulture. They are supervised by William M. Edwards, Teacher of Agriculture. (Photo by W. T. Ellis, North Carolina A&T State University)

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Featuring —

INNOVATION IN AGRICULTURAL EDUCATION