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ARTICLE SUBMISSION

Articles and photographs should be submitted to the Editor, Regional Editors, or Special Editors. Items to be considered for publication should be submitted at least 90 days prior to the date of issue intended for the article or photograph. All submissions will be acknowledged by the Editor. No items are returned unless accompanied by a written request. Articles should be typed, double-spaced, and include information about the author(s). Two copies of articles should be submitted. A recent photograph should accompany an article unless one is on file with the Editor.

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The Hexahedral Model For Vocational-Technical Agricultural Education



JASPER S. LEE, EDITOR
(The Editor also serves as Professor and Head, Department of Agricultural and Extension Education, Mississippi State University.)

When agricultural educators speak (or write) do they communicate? Many times they do. Many times they don't. How can communication within vocational-technical agricultural education be improved?

Ways to improve communication include refining program terminology, relationships, and articulation; improving communication skills in the profession; and developing the profession collectively and singularly. Over the past 36 months a variety of themes and articles have appeared in THE MAGAZINE. Some have effectively addressed the subject. Others have been poorly written and ineffectively dealt with philosophy, program mission, pedagogy, and other areas. It is apparent that there is a wide disagreement over certain aspects of vocational-technical education in agriculture. In some cases, ignorance may be the root of the problem.

There is a great need for the leaders of vocational-technical agricultural education to seriously address a number of substantive issues. To not tackle them will result in a weakened future. We need to clarify our profession — to clarify our reason for existence.

Program Relationships: The Model

In order to help members of the profession in understanding program component relationships, the hexahedral model for vocational-technical agricultural education has been developed. The model uses a wholistic approach to program structure. It is comprised of a hexahedron (a solid figure with six plane surfaces), three subhexahedrons, and nine cubistic hexahedrons.

The hexahedral model for vocational-technical agricultural education is appropriate for several reasons:

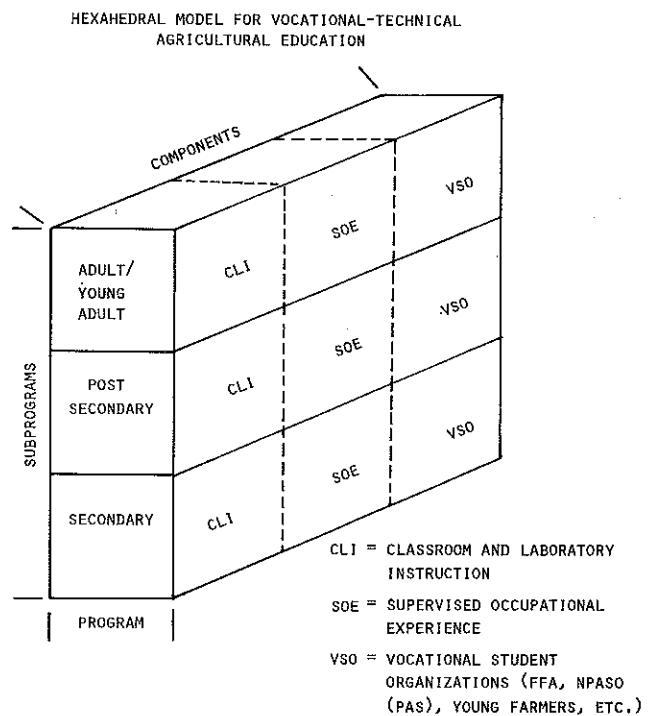
- It shows that there is one overall program of vocational-technical agricultural education.
- It shows that there are three subprograms, or subhexahedrons: secondary, postsecondary, and adult/young adult.
- It shows that the three subprograms are comprised of three similar cubistic components: classroom/laboratory instruction (CLI), supervised occupational experience (SOE), and vocational student organization (VSO).
- It shows that CLI, SOE, and VSO are (or should be) integral parts of the subprograms.

By using this model, the precision of communication among vocational-technical agricultural educators will be greatly improved. The model will result in improved curriculum development, staffing, resource allocation, evaluation, and accountability measures.

Why the Hexahedral Model?

When we think of vocational-technical agricultural education, the vast majority tend to think only of secondary-level instruction for in-school students. Yet, all of us know that the program is broader. It includes post-secondary and adult instruction. This model forces us to see the entire program.

The hexahedral model puts subprograms and components into the proper perspective. It causes us to see the relationships that exist among the subprograms. It should result in the equitable distribution of resources to subprograms and components. No longer will critics be able to say that "the FFA tail wags the vo-ag dog!"



(Continued on Page 4)

Welcome. Thanks. Finis.

Welcome

Dr. Larry E. Miller of the Ohio State University becomes Editor of THE AGRICULTURAL EDUCATION MAGAZINE beginning with the January, 1983, issue. He is an outstanding professional; a tremendous human being. The profession should support Dr. Miller and THE MAGAZINE to the fullest extent.

To serve as Editor is a seven-year commitment. One year is used preparing to be Editor. The editorship is for three demanding years — 36 monthly issues. Three years are then spent as Consulting Editor. Quite a commitment!

Thank You

My term as Editor has been a mixture of disappointments and pleasant surprises. Quality had to be sacrificed too many times. (One of the things I did learn is that some of the biggest critics are non-writers.) The resources to produce THE MAGAZINE are limited. Too many people who should subscribe, read, and write don't do either!

To the individuals who have supported me as Editor, I say, "thank you." My professional family in the Department of Agricultural and Extension Education at Mississippi State University and my personal family made many sacrifices for my work. The individuals who served as

Theme Editors, Regional Editors, and Special Editors helped make my editorship possible. The Business Manager, Editing-Managing Board, and authors of articles are thanked for their cooperation and support. Sue Smith of M & D Printing Co. has been outstanding in her work with THE MAGAZINE. Thanks, Sue.

The final thank you is to the profession for allowing this Southern country boy to be Editor. If I have been successful as Editor, there are several people along the way who have helped me develop professionally: Joe Treloar, Obed Snowden, and Lloyd Phipps. These individuals are strong professionals. Thanks to them and all of you.

— Jasper S. Lee

Finis

The Cover

Evaluation in all phases of vocational-technical agricultural education is important. The cover shows a contestant in the FFA Safe Tractor Operation Contest being evaluated. (Photograph courtesy of the National FFA Center, Alexandria, Virginia)

THEME

Evaluation Is The Key to Improvement

The mention of evaluation often brings negative thoughts to students, teachers, and administrators. However, it should bring positive thoughts for it is the primary tool educators have to improve students, teachers, and programs. Without evaluation, one would be unlikely to realize areas in which improvement is needed. At the same time, one might not recognize strengths that do exist within a program.

The process of evaluation need not be an experience in anxiety. If approached properly, the student can actually look forward to a chance to show how much he/she has learned in a particular area. The teacher can and should treat teaching evaluations as constructive and conducive to self-improvement. Program evaluation can give insight to the teacher and administrator that may be difficult to observe because of their closeness to the situation. Many times teachers will discover that outside observers evaluate a program to be much different than they had perceived it.

Student Evaluation

Evaluation of students is usually by the teacher. With this in mind, the teacher has a responsibility to evaluate the students in the classroom setting, laboratory situation, their supervised occupational experience (SOE) program, and to some extent, their involvement and progress in Future Farmers of America (FFA) activities.

Most teachers have spent a portion of their college education learning about testing and measurement of students

By JERRY CROWNOVER

Editor's Note: Dr. Crownover is Assistant Professor, Agriculture Department, Southwest Missouri State University, Springfield, Missouri 65802. He previously taught vocational agriculture in Carthage, Missouri. The Editor greatly appreciates Dr. Crownover's work as Theme Editor.

in the classroom. Evaluation of vocational agriculture students in the classroom does not vary much from the evaluation of students in other academic areas.

Evaluation of students in the laboratory setting does, however, differ from the ordinary. Many teachers evaluate only the end product, such as a completed sawhorse or floral arrangement. The laboratory evaluation should include the process as well as the product. The procedures, basic skill development, and work habits are often more important than the end product.

A student's SOE is possibly the most difficult aspect to evaluate because of differences in goals and opportunities that exist for each individual. Some organization and consistency in the evaluation of the SOE can be developed by the teacher and should be understood by students as they enter the program.

Evaluation of the student's involvement in FFA activities is carried out in many ways. Some FFA chapters keep a point chart to determine the most active members. Other times, the FFA members may be evaluated as to their success in contests, proficiency awards, achievement awards, and other forms of competition included in the FFA.

Teacher Evaluation

The teacher can be evaluated by various people. The evaluations can be used as sources of information for improving everything ranging from teaching techniques to personality.

Evaluation of the teacher by the students can give valuable information as to the perceptions students have of the teacher's abilities. From these, the teacher may determine that improvement is needed in areas such as academic competence, methodology, dress, and an endless list of other traits and abilities.

As administrators evaluate teachers, abilities such as organization, cooperativeness, and program planning determine the areas that need improvement.

Program Evaluation

The most important type of evaluation is that of the total program. It may be conducted by staff from the state department of education, administrators, advisory committee members, young farmers, or evaluation groups such as those of accrediting associations. The more people are involved in evaluation process, the more ideas are likely to be gained for program improvement. This also holds true for the different types of people that are involved.

There are many points within a total program that should be evaluated. Some of the most common are:

- Facilities and equipment
- Course offerings
- Adult program
- Departmental records
- Teachers
- Student placement after graduation
- Budget
- FFA activities



A review of the instructional program involves assessing teaching aids, audiovisuals, and curriculum material. (Photograph courtesy of G.W. Hamby, Missouri)

The end result of program evaluation should be the formation of a long-range plan to better meet the needs of the community served by the vocational agriculture program. Realistic goals, effective ways and means, and proven products are all the result of a good evaluation.

Informal Evaluation is On-Going

Hopefully, one can have a better understanding for the need of evaluation in a vocational agriculture program after reading this issue of THE MAGAZINE. The process of evaluation is an on-going one that leads to constant upgrading and improvement. This improvement will bring about better students, teachers, and programs.

BOOK REVIEW

MANAGEMENT FOR RETAIL FLORISTS, by Glenn H. Sullivan, Jerry L. Robertson, and George L. Staby, San Francisco, California: W.H. Freeman and Company, 1980, 545 pp., \$22.95.

MANAGEMENT FOR RETAIL FLORISTS is segmented into four parts. The first section gives an overview of the floriculture marketing structure including production, wholesaling, and retailing. The second section discusses the principles of operating a retail floral business including economic planning, marketing and managing functions. Similarly, the third section concerns the garden center and nursery segments of the industry. The last section discusses the principles of floral commodity handling, storage, and preservation for maximum market life.

The authors of the text are experi-

enced university professors of floriculture, and they have conducted extensive floriculture research projects with emphasis on commodity handling and market structure. Some of the authors have taught numerous classes concerning the floriculture industry at The Ohio State University.

MANAGEMENT FOR RETAIL FLORISTS is a complete volume to instruct the student in developing a business within the floriculture industry. It is not, however, written on the level of the high school student; the book could successfully be used by university level students. It can be used by the high school instructor to supplement the class. The text includes many valuable tables and diagrams which could be easily utilized for bulletin boards, charts, or overhead transparencies. For example, one

table lists the names of firms producing floral products and defines each; thereby yielding an easy reference guide for the students. At the end of each chapter, the authors have extensively listed applicable selected readings. Several of the readings are from industry periodicals and these are written on the high school reading level. The instructor may use these readings to let students gain added insights of a particular subject.

Another audience to consider for this text is that of the adult group. A class in retail management in the floriculture industry would benefit from this book regardless of the experience of the students.

Christine Davis Townsend
Iowa State University
Ames, Iowa

A Supervisor's Perspective On Program Evaluation

The main reason for program evaluation is program improvement. This may not always seem to be the case by the one whose program is being evaluated. As a supervisor, I view evaluation as an over simplified process that addresses the following questions: What is the program designed to do? How is it being done with resources available? How well is the job of instruction being done? What improvements can be made and how? As a teacher when his or her program is looked at, what factors contribute to the success or lack of success in program outcome? Why are some teachers successful and others less so in given situations of instruction? Evaluation for the supervisor is to try and identify those factors that make a program successful or not successful.



By G.W. HAMBY

Editor's Note: Mr. Hamby is District Supervisor for Agricultural Education with the Missouri Department of Education, Mt. Vernon, Missouri 65712.

teachers and the school administration. Concerns, recommendations, and strengths are reported verbally and in writing to both the teacher and administrator. The view is to strengthen and improve the local program.

Instructors are no less evaluators of their programs than is the district supervisor. They determine the input of available resources that goes into the instruction. To determine the "why" of success or failure, records of activities must be a part of departmental files. These are then used in determining and evaluating program outcome.

The form used in Missouri by the supervisors with their teachers is presented. It is to collect meaningful information regarding the local program.

The final criterion of evaluation is the program product — the student. The program must in the final analysis provide for placement and employment in relation to occupational objectives along with the necessary personal and leadership skills that are necessary for success.

Our Evaluation Process

In Missouri, the basic instrument of the process of evaluation is an evaluative questionnaire. It is sent to the local instructor well ahead of the on-site review by the supervisor. The major categories of response on the questionnaire deal with eight areas: philosophy and objectives, administration, staffing, instructional methods and resources, facilities and equipment, student placement and follow-up, equity, and special needs.

The above eight headings are looked at in detail during the evaluative process to determine program strengths and weaknesses. This document is used by the local school personnel as a self rating device. It is reviewed by the supervisor and teacher during the on-site visit. This process of evaluation brings to light concerns that are shared with the

BOOK REVIEW

PLANT PROTECTION: AN INTEGRATED INTERDISCIPLINARY APPROACH by Webster H. Sill, Jr., Ames, Iowa: The Iowa State University Press, 1982, 297 pp., \$23.95.

PLANT PROTECTION is composed of eighteen chapters to provide information about several plant protection disciplines and how these disciplines are interrelated. An overview of what plant protection is and how it is associated with a variety of factors such as environmental, political, social, and economic conditions are discussed in the first three chapters.

Chapter four provides a brief look at the problems and dangers of the use of computers in systems analysis. Emphasis is placed on the need for more practical computer training programs in

plant protection.

The areas of chemical controls, pesticides compatibility, cultural controls, environmental and nutrition, biological controls, plant resistance, and vertebrate pests are addressed in chapters five through fourteen.

The remaining four chapters (fifteen through eighteen) deal with the area of plant protection management. Integrated pest management (IPM) is defined as one approach for controlling pests. Many examples are provided in a discussion as to the practical value of IPM. Plant protection must be a product of a cooperative effort that involves a combination of controls (plant breeders, growers, chemical, cultural, biological). Chapter seventeen provided insight into how recommendations

for protecting plants sometimes conflict. The final chapter re-emphasizes the interdisciplinary approach to plant protection.

The author, Webster Sill, Jr., has conducted research in plant pathology, virology, fungicides, fumigants, seed treatments, and in environmental areas as related to land use. His work in various aspects of plant protection is widely recognized.

PLANT PROTECTION: AN INTEGRATED INTERDISCIPLINARY APPROACH is a good teacher reference and could be used by postsecondary agriculture students in an introductory integrated pest management course.

Fred Reneau
Southern Illinois University
Carbondale, Illinois

EVALUATION

School _____ Date _____
Superintendent _____ Voc. Ag. Instructor _____

This form is to serve as a guide in reviewing your Vocational Agriculture program. The following instructions should be followed:
1. The instructor of Vocational Agriculture should complete as much of the form as possible before the time of the visit by the district supervisor.
2. The information and reports listed under Section I should be available for the superintendent and supervisor on date of visit.
3. A completed copy of this report will be left with the instructor of Vocational Agriculture.

I. REPORTS AND GUIDES

- A. VA-1 Teacher's Monthly Report No. days _____ No. visits _____
- B. VA-2 Preliminary Report of Vocational Agriculture
- C. VA-3 Report of Supervised Occupational Experience
- (1) Validating forms 61/128
- D. VA-5 Annual Report of Vocational Agriculture
- E. FV-4 Request for matching funds, equipment
- F. Advisory Committee Roster _____ Minutes _____
- G. Individual Student File
- (1) Occupational Objective
- (2) Training Agreement
- (3) Forms 61/128
- (4) Follow-up Data
- (5) Safety Tests and Information
- (6) Other
- H. FFA Roster _____ Program of Work _____

II. HIGH SCHOOL PROGRAM

- A. Enrollment
- Class/Period Fresh. Soph. Jr. Sr. Girls Boys Total
- 1. _____
- 2. _____
- 3. _____
- 4. _____
- 5. _____
- 6. _____
- 7. _____
- Total Enrollment _____
- Individual Students _____
- Number students placed for school credit
- B. Course Organization:
- (1) Using definite course plan for all classes taught
- (2) Using available guides for courses
- (3) Following a prepared teaching calendar
- (4) Students meet course prerequisites
- (5) Agribusiness offerings
- C. Occupational Records:
- (1) Supervised occupational experience program in addition to class time:
- 1. Number of students enrolled in Voc. Agri. at this time last year (unduplicated count)
- 2. Number of students completing ownership, SOEP only
- 3. Number of students completing placement, SOEP only
- 4. Number of students completing both ownership and placement, SOEP only
- 5. Total number of students completing SOEP's, 2+3+4
- 6. Total student labor income, ownership SOEP
- 7. Total student labor income, placement SOEP
- 8. Total student labor income, department 6+7
- 9. Average SOEP labor income per student $7 \div 5$
- 10. Percentage of students completing SOEP, $5 \div 1$

- (2) Supervised occupational experience record books up to date _____
1. Time allocated to records _____
 2. Grading procedures _____
 3. Completeness of records _____
 4. Other _____

III. ADULT/YOUNG FARMER/YOUNG FARM WIVES PROGRAM

A. Courses Conducted or In Operation	Year-Round Management	Regular Adult/YF	Other
(1) Total Number Enrolled	_____	_____	_____
(2) Number of Meetings	_____	_____	_____
(3) Average Attendance	_____	_____	_____
(4) Total Classroom Hours	_____	_____	_____
(5) Average Length of Meetings .	_____	_____	_____
(6) Number Visitations	_____	_____	_____
(7) Total Hrs. Individual Instruction	_____	_____	_____
(8) Average Hours Individual Instruction per Visitation	_____	_____	_____

IV. SUMMER PROGRAM

- A. Summer activities calendarized and copy submitted to superintendent _____
- B. Number of days on which occupational instruction was given during summer months, all groups _____
- C. Number of occupational instructional visits made during summer months: High School students _____, YF/YFW _____, Adults _____, Others _____, Total _____
- D. Number of prospective students visited _____
- E. Number of meetings held: Adults _____, YF/YFW _____, FFA _____, Other _____, Total _____
- F. Shows and Fairs _____
- G. State Young Farmer/Young Farm Wives Tour _____
- H. State FFA Leadership Camp _____
- I. District and/or Area FFA Leadership Training Meeting _____
- J. Summer School: Place _____ Credit _____ Number of weeks _____
- K. Summer Workshops: _____

V. OTHER PROFESSIONAL IMPROVEMENT

- A. Area and District Meeting Attendance _____
- B. College Work: Place _____ Credit _____ Number of weeks _____
- C. Workshops: No. of hours _____
- D. MVA-MVATA Conference Attendance _____

VI. BUILDINGS, EQUIPMENT, AND TEACHING AIDS, BUDGETING PROCEDURES, ETC. COMMENTS:

VII. FFA ACTIVITIES

- A. Awards received by FFA last school year: (1) Chapter activity program, Superior _____, (2) BOAC _____, (3) Safety _____, (4) Other _____
- B. Chapter participated on Area level in: (1) Public Speaking _____, (2) Extemporaneous Speaking _____, (3) Parliamentary Procedure _____, (4) Creed Speaking _____, (5) FFA Knowledge _____
- C. Number of proficiency award applications submitted to Area _____, State _____, National _____ activities.
- D. Books entered in area contest: Official secretary's book _____, Official treasurer's book _____, Reporter's scrapbook _____, First year SOEP record book _____, Completed SOEP record book _____
- E. Participation in Area _____, District _____, State _____, contests.
- F. Did your chapter have a State Farmer Applicant? _____ American Farmer Applicant? _____
- G. Parent night held early in school year or summer _____
- H. Parent-Member Banquet held _____
- I. Did your chapter participate in an area banquet? _____
No. of students _____ No. of adults _____
- J. Is there an Alumni Affiliate? _____
- K. Other _____

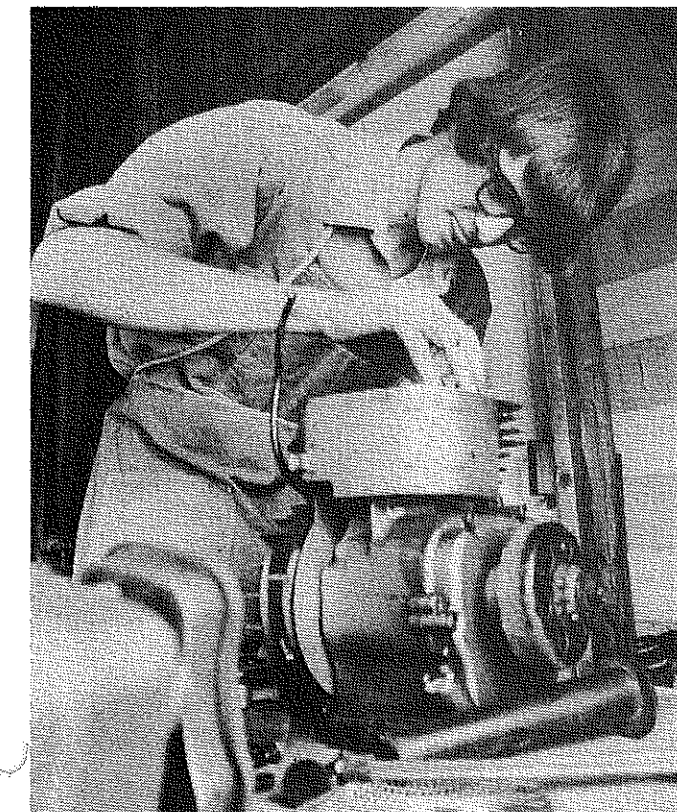
THEME

Evaluating Agriculture Mechanics Instruction

The entire vocational agriculture program in many locations is evaluated most often on its agriculture mechanics laboratory. There are several reasons for people to evaluate the entire program on only this one aspect. The size and visibility of the "shop" and the projects developed in it cannot be overlooked. The money that is spent for and generated by the agriculture mechanics portion of the program is far greater than most other aspects of the program. Students and members of the community often relate the entire program as the "vocational agriculture shop."

Evaluation, or judgment by others, is an on-going process. We, as vocational agriculture teachers, should be doing some evaluation ourselves. We should also pay attention to the evaluations by others of our departments. In rural communities, the vocational agriculture department is one of the most prominent school facilities. The only exception may be athletics.

Evaluation of agriculture mechanics instruction involves at least three areas: evaluation of the facilities, evaluation of teaching methods, and evaluation of the skills developed by students.



Hands-on learning should be assessed in agricultural mechanics. (Photograph courtesy of the National FFA Center, Alexandria, Virginia)

By JIM HOWARD

Editor's Note: Mr. Howard is Vocational Agriculture Instructor at Mt. Vernon High School, Mt. Vernon, Missouri 65712.

Facilities and Equipment

Facility evaluation should be done by the vocational agriculture teacher, the school's administration, the advisory committee, and the people served by the vocational agriculture department. Many of the criteria used to evaluate the agriculture mechanics laboratory are quite obvious but often overlooked.

Neatness and cleanliness is of utmost importance, and is the first thing noticed by incoming students and any guest to a department. All too often the vocational agriculture building can be located easily at a school district by finding all sorts of trash, scrap metal, and barrels just outside its doors.

Safety and safe practices are often linked with the neatness of the agriculture mechanics laboratory. It is impossible to demonstrate safe practices while having to step over loose cords, boards with nails in them, and other obstacles. Safety and neatness even go hand in hand when it comes to keeping the windows and light fixtures clean.

Modern practices should be taught in the agriculture mechanics laboratory. Though hand tools should be available and instruction presented on them, the tools of the trade today need to be available, and instruction and evaluation of student's progress on these tools must be of high importance.

Properly maintained tools kept in serviceable condition are important criteria for evaluating an agriculture mechanics laboratory. Tools must be kept sharpened, all shields in place, free from rust and dirt, and ready for use. If not, the facility receives a low score.

Materials must be available for work. Adequate consumable supplies, such as nails and electrodes, must be on hand. Even the simplest required project loses meaning in an agriculture department that is always waiting for supplies to arrive.

The product of construction should be used to evaluate the agriculture mechanics laboratory. The eventual material outcome of the vocational agriculture mechanics laboratory is some sort of project. If that project does not conform to the plan, the mechanics program has lost marks.

Teaching Methods

Ultimately, what the student has learned and retained from experiences in agriculture mechanics instruction is the

(Continued on Page 10)

Evaluating Mechanics Instruction

(Continued from Page 9)

triest evaluation of a teacher's methods. Methods are hard to evaluate in any process, but perhaps more easily done in the mechanics field. Repetition of skills is essential in most mechanics areas to become proficient with the skill. Teachers can evaluate their methods by the extent that students are able to fulfill their skills correctly.

Self evaluation by the teacher is important and should be done daily. How many times have you caught yourself, after not being properly prepared, saying, "We're going to shop today, class." Or how many of us as teachers consistently have students with nothing to do. In your self evaluation, both of these statements need careful observation and more thorough planning for the agriculture mechanics program so they do not occur.

I am reminded of a student teacher who on the second day of demonstrations of oxy-acetylene equipment did not use goggles or gloves. When questioned by the supervising teacher he remarked, "I taught them that yesterday." So not only do we need to teach correct methods, but we need to follow them consistently as the instructor.

Other methods that need to be evaluated are how accurate are our bookkeeping procedures. A lot of expense is involved in an agriculture mechanics shop. Are materials being paid for? Are consumables being replaced? Are students aware of costs, and how to determine the price of finished projects?

One of the best ways of evaluating the teaching methods in mechanics is by the pride and respect that the students have for their projects, teacher, and program.

Student Skills

It is the duty of the teacher to evaluate (grade) students on their agriculture mechanics skills. Criteria for this evaluation should be measurable, known by the student and teacher, and done on frequent intervals. Criteria that should be used for evaluating students are:

1. Safe working practices
2. Selection of proper tools
3. Upkeep and use of tools selected
4. Clean-up procedures
5. Appropriate use of time for the project
6. Preparation for finishing
7. Finishing of the project
8. Displaying the project

Students will typically skip over procedures or cut corners whenever they are allowed to do so. All projects leaving your vocational agriculture mechanics laboratory should be a credit to the student, to you (the teacher), and to the department in the eyes of the students, their parents, and the community. Every project should be appropriately finished when it leaves the building. Students should be encouraged to exhibit their finished projects at agriculture mechanics shows.

Upgrade Image

Evaluating the agriculture mechanics laboratory in local high schools is vital to their upgrading and image in the community. The mechanics laboratory is a very obvious part of the entire department and is the only material aspect of the department that many in the community see. Evaluation should take place on the three levels described in this article and should be a continuing process.

THEME

Evaluating SOE Programs

The process of evaluating SOE programs is a difficult task due to the many variables that exist from one student's situation to another. There is always the age old problem of opportunities and resources available to one student when compared to another. Another problem in making evaluations and comparisons naturally occurs with varying interests and occupational goals. As a result of these, as well as many other variables of comparison, it would appear that the task of comparison must be made simpler. This can be accomplished by the establishment and implementation of specific SOE program development guidelines.

Overview of Local Agriculture

I feel that my readers should have some understanding of my area's characteristics. Dent County, Missouri, contains only one major incorporated town, which is Salem, its County Seat. Salem's population is about 4,470 and the total county population is about 14,500. The farm population is well under 2,000. The only high school in the county is within the AAA rated Salem R-80 Schools which has about 1700 students. Also within the county are four K-8 elementary districts and two church schools with a total

BY BOB PARSONS

Editor's Note: Mr. Parsons is Vocational Agriculture Instructor at Salem R-80 High School, Salem, Missouri 65560.

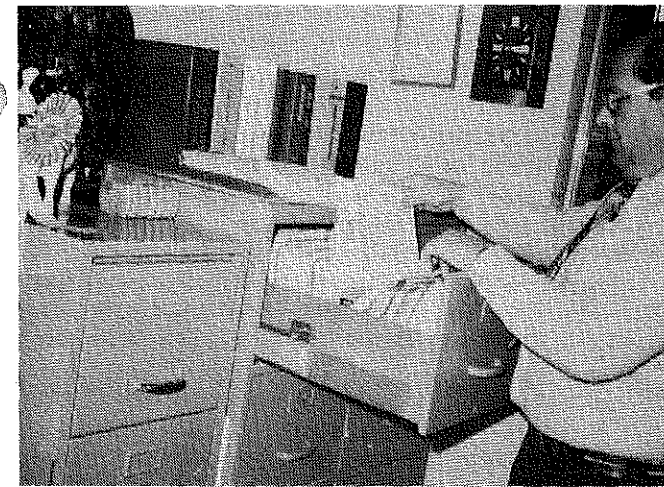
student enrollment of about 1,000.

The county is 50% covered by forests which makes timber harvesting a vital portion of the local agricultural economy. The latest statistical data indicate there is a total of about 34,000 head of cattle and about 14,000 head of hogs on Dent County farms. Hay and pasture are the major crops grown for the feeder cattle and yearling back-grounding operations. Most hogs are marketed as feeder pigs. There are less than 2,000 acres of row crops grown on the 483,840 acres in the county. The 1978 Census of Agriculture indicates there were 769 farms in the county at that time.

This information should be helpful in understanding some of the limitations and potentials in assisting students in developing SOE programs.

SOE is Required

All students entering the Salem Vo-Ag Program are



Evaluation should include a review of departmental records. (Photograph courtesy of G.W. Hamby, Missouri)

required to conduct an SOE program. This is a major point stressed during the 8th grade Vo-Ag and FFA Orientation Programs. During the summer prior to entering our program each prospective student is visited and, along with their parents, advised again about the requirement. During the visit, they are given a list of some 30 possible SOE enterprises. The list also indicates the minimum scope and size allowable to fulfill the SOE requirement. The areas of agriculture that are listed include beef, dairy, swine, sheep, poultry, various field crops, timber, orchards, vineyards, garden crops, greenhouse operation, nursery operation, agribusiness ownership, custom work, and placement. This list is relatively standard across Missouri and was developed from the Final Report of Supervised Occupational Experience submitted to our State Department of Education. The specific scope and size of units are important from a local standpoint only and would have to be designed to fit each locale.

Guidelines

The guidelines outline specifically that a student must develop one production unit during the first year in vo-ag. Some typical examples are: one beef cow with calf, three beef yearlings, four bred ewes, five acres timber stand improvement, and 300 hours of placement. A combination of units such as two bred ewes and 150 hours of placement is also allowable.

These guidelines say that during the second year, vo-ag students should show growth and expansion of their SOE program by either doubling the size of their enterprise or by including additional enterprises. Third and fourth year vo-ag students should show additional growth and/or diversification of their SOE. They would continue programs that fall within the scope of units contained in the original guidelines. One change in requirements is made for the advanced students and it deals with the placement programs.

In the case of placement programs for juniors and seniors, any placement program is allowable that is within the production agriculture or agribusiness fields. Minimum

placement programs without accompanying production enterprises must average 25 hours per month during the school year and 25 hours per week during the summer for a yearly total of 525 hours.

Supervision

Until the current local budget restrictions, the department had averaged over three supervisory visits per student each of the past 5 years. Because of budget reductions, which came about as a result of the Missouri Department of Education eliminating travel reimbursement, this number will be reduced to an average of 1.5 to 2 per year. Previously, the goal for the Salem program had been to visit each student once per semester of the school year and twice during the summer. The summer visits during May and June were made by the instructor the student had completed the last school year under. Then during July and August each instructor would make a supervisory visit to the students that were scheduled to be in their classes in the fall.

Procedures in Evaluation

The evaluating of SOE is accomplished through two procedures. First of all at the end of each supervisory visit the instructor and student jointly complete a Supervised Occupational Experience Record form. This is a self-duplicating form which is signed by both the teacher and student. Included on the form are remarks, observations, and recommendations relative to the size and quality of the SOE program, management practices being observed or overlooked, future plans, goals, and objectives, Proficiency Award Areas being worked on, as well as other relative information. One copy stays with the student and is placed in his or her record book. The other copy is placed in the student's permanent file in the vo-ag office.

The second evaluative procedure involves the monthly grading of record books. The areas evaluated naturally include receipts, expenses, and the various supplemental and summary forms. In addition to these traditionally evaluated factors, an evaluation of the growth, quality, and scope of the SOE program is included in the grading.

There probably has never been, nor will there ever be, a simple or easy method of evaluating a student's SOE program. We had for years neglected any formal evaluation until the development of the system described here. In our area, where the economic situation of students ranges from the entire family being on government support programs to those that are wealthy and farm thousands of acres, this system meets our needs quite well.

I would like to point out specifically that an SOE program that is adequate in my community might appear small by comparison with other programs in a community richer in agricultural resources. Likewise, these standards may be high when compared with still other areas. I sincerely feel that vocational agriculture instructors can do a more honest and accurate job of evaluating their students if they have established specific criteria and guidelines concerning SOE programs.

Evaluation of the Vocational Agriculture Teacher

The evaluation of a vocational agriculture teacher should start at the time of employment. The credentials of the prospective teacher and information obtained through the personal interview should serve as evaluative tools. The ability to choose a teacher whose personality will blend with the community is very important.

Administrators are required to investigate and report the status of their programs periodically. The philosophy, goals, and objectives of the district must be given a review and a determination made as to the status of the program. The process is not the most pleasant in some instances. Many times teachers feel threatened by the evaluative process. I personally feel that the anxiety of evaluation can be overcome by the use of positive evaluative methods.

An On-Going Process

That program and teacher evaluation in vocational agriculture is a continual, on-going process. It is a team effort. The teacher is the administration's expert in the field. The establishment of goals and objectives for the agriculture department should involve all persons who are directly



How well the teacher works with students needs to be evaluated. (Photograph courtesy of the National FFA Center, Alexandria, Virginia)

BY DALE O'NEAL

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responsible for the success of the program. This procedure allows the administration and faculty members to know where they are, how they got there, and where they are headed in the future.

The use of the continual approach to evaluation does not allow for a build-up of problems that might not be easy to overcome. If an evaluation is only conducted one time per year, and there is little or no communication concerning evaluation, the chance for serious problems to arise during the evaluative process increases.

A suggested format for a continual approach to evaluation would be a series of steps. The first step would be to hold a conference with staff members to review the current status of the program and determine the needs of the program. Step two would be to develop a plan that would set out any problem areas that need attention or toward future program development. The plan must allow for modification as the process is followed. Step three would require periodic discussions to determine how well you are on your selected course of action. The final step would be to assess and start planning for the next evaluative cycle.

Today, the successful administrator must be a facilitator. The administrator must provide the support and the encouragement necessary for successful program improvement. The administrator must find time to do the evaluative process and continually promote new ideas to keep staff motivation at a high level.

Student Progress

One of the most important and often overlooked parts of an evaluation, especially in a multiple teacher program, is your final end product. Do all teachers measure student progress in the same manner? Do faculty members have the same standards? The administration must work with faculty members to establish an effective method of measuring student progress so you can determine to what extent the goals and objectives of the school system are being fulfilled. This can be accomplished through the use of student competency tests of skill attainment, academic performance, and other measurement methods.

The results of an evaluation of the vocational agriculture teacher and program is a valuable asset toward the justification of resource allocation in terms of money, staff size, etc. The bottom line is to be able to justify everything you request. You must be able to produce data that will

indicate how your program can be improved by the use of additional funds.

Student Quality

One area to consider in evaluation is the quality of students enrolled in the program. A good instructor can put forth all the effort in the world, but unless the students are motivated, a lot of extra-ordinary accomplishments will not be made. There must be allowances for this type of situation when evaluating a teacher or program. I have observed agriculture programs where the enrollments were

the most selective and others where no selection criteria were used other than the general enrollment procedure. I have always been told a good teacher will motivate the students. I think a good teacher can motivate some of the students but not necessarily all of them.

Good Communication Is Essential

The administrator and faculty members must work as a team to accomplish the stated objectives for a program. Communications is the vital link in the chain. There must be a set course to follow and the administrator must provide the leadership to attain the results desired.

Teacher Evaluation From A Student's Perspective

BY BILL YOES

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One of my college courses has taught me about the many ways to evaluate a teacher. There are tests to measure student improvement, standardized intelligence tests, observations by peers, and so forth. The most common way is to use your own intuition. Past experiences and personal opinions rather than tests designed by someone a thousand miles away are best.

The vocational agriculture teacher is one of the very important influences in the future of American agriculture. Preparing young people to be tomorrow's agriculturists requires a diversified background. How well you, the teacher, utilize diversification is how I, the student, evaluate you. I've seen many teachers and student-teachers during my 1890 hours of high school vo-ag instruction. Hopefully, I can highlight some of the skills I have observed. The four basic areas of evaluation are the classroom, the laboratory, supervised occupational experience supervision, and Future Farmers of America advisor duties.

Classroom

The classroom gives the student and instructor their first impressions of each other. The way the teacher controls the classroom dictates control in all other areas. Does the teacher control the students, or do the students manipulate the teacher? When the teacher argues with the students, things are out of control; therefore, discipline is more ineffective and less efficient. Teachers should make their academic and disciplinary expectations known to the class.

Provide a challenge for the students. Some instructors have a tendency to "go easy" in agriculture courses. This hurts the students and the program. When students learn to work hard in class they will know how to work hard in the other areas.

Let the students know the course of study. I appreciate a teacher who provides an outline of what will be covered in the future. Most students learn more when they can see a goal. It's difficult to work toward a goal if you don't know what it is. I become confused when teachers wander

aimlessly about, jumping about from one subject to the next. Follow a clear cut plan and have tests regularly. Emphasize the points that will be on the test and have a short review. Go over the test after it's graded and explain problem areas. This may seem like juvenile information but most teachers forget the basics. An organized classroom avoids many other problems.

Laboratory

The "shop" has the potential for being either the most interesting or boring place in the program. Here again, the initial stages are very important. Good teachers make safety rules and basic skills mandatory. They must also observe rules and techniques themselves. It is frustrating for a student to see the instructor break the rules.

When the students have reached a more advanced level of skill the teacher has the job of helping them come up with projects on which to apply their skills. Help the students with technical problems that arise. It is irritating when the instructor comes along in time to say something is wrong. Talk about the project before it is started. Give a few awards to create incentive for students to excel in shop.

Supervised Occupational Experience

In my senior year in high school I worked afternoons at a local meat processing plant in my supervised occupational experience program. Since then I have continued working there after school for two years. During this time I have had considerable experience evaluating teachers in this area. It is essential for you to see the student in action. Try to visit at least twice during the

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Teacher Evaluation From A Student's Perspective

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year. Missouri requires monthly reports outlining tasks completed, hours worked, and wages earned. In addition to this, my school sent a report card for the employer to fill out each quarter. The teacher has to insure success in programs like this. If the teacher doesn't stay in contact with all parties involved, the program will fall apart. Requiring all parties to sign an agreement will make the program run more smoothly. If SOE isn't regulated the student, or the employer, or both may not be fair to each other. Training employees is very expensive, especially in highly skilled occupations.

The production related programs are equally as important. When visiting the student on the farm, try to evaluate their projects and compare to others. A diverse background is especially handy in making suggestions for improvement. The guidance of someone with more experience is valuable to young people in a business venture.

FFA

The last area is complicated indeed. FFA and vo-ag are dependent on each other. The two can hardly be separated. They go together like a tractor and plow. If the tractor is fueled and the plow properly adjusted, together they can accomplish the job. So go good teaching and good advising. The more successful teachers are equally effective as advisors and vice versa.



Students evaluate teachers on the basis of how well they carry out laboratory instruction. (Photograph courtesy of Richard M. Hylton, California Polytechnic University, Pomona, California.)

One way to evaluate an advisor is to observe his or her students. Active FFA members are proud to wear the blue and gold. It is the advisor's commitment to motivate and advise members. The advisor shouldn't need to run the chapter. If he or she motivates the members, they will want to make the chapter successful.

The vo-ag teacher's role is an important part in today's agriculture. What you do as a teacher and advisor has a powerful impact on the future of the biggest industry in America.

ARTICLE

What and How to Evaluate

There has been an increasing interest for evaluating of agricultural education and vocational education programs over the past few years. As a result of the interest in evaluation, students, parents, the general public, and educators have become increasingly aware of the role agricultural education performs in preparing youth and adults for the world of work.

In a technological age, knowledge is replacing opinion and evidence is replacing guesswork. Observation is no longer an adequate way to measure program effectiveness, therefore, a more sophisticated means of evaluating programs is imperative.

What, then, is involved when one says that evaluation must be done? Ralph C. and J. William Wenrich¹ say that evaluation is directly related to planning and specifying goals and objectives. In Module A-11², The Center for Vocational Education, program

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evaluation is the task of making judgments about the worth or value of a program. Evaluation, then, is considered in this article to be a process and not a product. The produce of the evaluation process is the decision that is made based on the evaluation. John K. Coster and Patricia D. Poplin³ say that one needs to raise the question, How should programs be evaluated? To attempt to answer this question three areas are discussed: 1) the elements involved in evaluation, 2) the method to use in evaluation, and 3)

implications for improving programs based on the results of evaluation. These three points will become the major emphasis in this article.

Elements

In discussing the elements there are at least four components, and possibly many others, to consider in program evaluation. These elements are curriculum, students, teachers, and facilities and/or other resources. With these components in mind, let's begin with the curriculum.

Curriculum. There are many definitions for curriculum. However, a simple definition that is acceptable to many educators is that curriculum is the sum total of all activities engaged in by the student for which the school has responsibility. Some people will say that this definition is too narrow. It does, however, put certain responsibilities on the school for determining

what one needs to learn in order to succeed on the job.

The curriculum should be based on student needs relative to job success, therefore, student progress and student placement becomes exceedingly important.

Students. One basic way of determining student progress is to determine where a student is when he/she enters the program and where he/she is when the program is completed (pre and post test). The progress one makes while in training is important, but it is equally important to determine the number of students who were employed and succeeding on the job as a result of the program. Even though it is difficult to determine success on the job as the result of training it is an important criteria to use in evaluating a program.

Teacher. To determine the effectiveness of a teacher one may use the "trait" approach or the "result" approach. Lewis⁴ says that the "trait" approach is based on the assumption that once educators become familiar with their jobs, they tend to develop an individual style, a characteristic way of performing in their area of responsibility. Usually, the traits to be used for evaluating the teacher's effectiveness will be identified before the program begins. Therefore, the teacher and administrator know what criteria will be used in determining the effectiveness of the teacher.

In using the "result" approach one is to achieve certain performance objectives which are based on student needs. Therefore, the efforts of the teacher should be directed toward getting specific results which are consistent with the philosophy, policies, and procedure of the school or program. In short, results are compared to the objectives of the course or program.

Facilities/Other Resources. Appropriate facilities and/or other resources are imperative for having a good quality program. It seems obvious to the writer that unless adequate facilities and supportive resources are available that the quality of a program will be reduced and learning will be deterred.

Methods of Evaluation

All relevant and uncontrollable areas of concern can be classified into two broad categories: process and product according to Erickson.⁵ He fur-

ther states that process areas of concern cause one to focus the appraisal of instruction on the instructional process and the product areas of concern, on the other hand, causes one to focus the appraisal of instruction on the product or end result of the instruction. Examples of process and product areas of concern according to Erickson are:

Process Areas of Concern

1. Instructional Objectives
2. Lesson Plans
3. Instructional Media
4. Assessment and Feedback
5. Student/Teacher Rapport
6. Instructional Facilities

Product Areas of Concern

1. Skills Learned
2. Knowledge Developed
3. Problem Solving Abilities
4. Safety Habits
5. Work Attitudes
6. Employability

Probably the first step is to decide whether to use process or product evaluation and then decide key questions to be answered by the assessment. The final step seems to be that some test, activity or procedure is devised to evaluate the process, the product or both.

Implications for Improvement

George A. Goens⁶ in the February, 1982, issue of the KAPPAN in the article "Myths About Evaluation" state that after a great deal of research there were some implications for public schools that can be drawn from evaluations. Parts of Goens' summary that apply to program evaluations are as follows:

1. School administrators must work to develop a commitment from the staff to the goals of the school and the district, emphasize teamwork and a sense of community, and help staff members establish objectives and analyze results.



Exit skills of students should be assessed. (Photograph courtesy of G.W. Hamby, Missouri)

2. Find and hire the best and the brightest. Once they are hired, individuals must be integrated into all facets of school operations.

3. Staff development — with emphasis on analysis, not appraisal — is the key to productivity and teacher satisfaction.

4. Goal setting, not criticism, produces results in employee performance and satisfaction. In addition, goal setting can create commitment to the organization and its goals. Feelings of involvement, importance, and teamwork can result. Teacher self-esteem can be increased.

5. If once-a-year, comprehensive performance appraisals are not cost effective and may be counterproductive, then schools must change their approaches to managing human resources.

6. Suggestions are more readily accepted if they are made little by little, over a period of time, instead of being dumped en masse in a teacher's lap. To do this, principals have to get out of their offices and into classrooms so that they know what is happening in their schools.

7. Personnel appraisal for promotions and contract considerations should be separated from analyzing instruction and developing staff skills and potential.

8. Problem solving, in a cooperative and supportive environment, is more productive than blaming. Blaming leads to avoidance and defensive behavior. Problem solving leads to cooperation and teamwork.

Whether employees increase their effectiveness, productivity, and satisfaction depends on whether administrators follow old myths or contemporary realities.

Goens, in the writer's opinion, stresses the need for evaluation, but, in addition indicates the importance of establishing a team effort in the school and a logical approach to improving programs. These same principles apply equally well to agricultural education.

Summary

In summary, one should consider at least three components when evaluating agricultural education programs. These components are: the elements to include, the method to use

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What and How to Evaluate

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when evaluating, and, finally, the implications for improving programs. In agricultural education as well as other vocational programs, improvement is necessary if students are to continue to be competent in the jobs they are trained to do.

References

¹Ralph C. and J. William Wenrich, LEADERSHIP IN ADMINISTRATION OF VOCATIONAL AND TECHNICAL EDUCATION, (Columbus, Ohio: Charles E. Merrill Publishing Company, 1974) p. 260.

²Modules A-11, Evaluate Your Vocational Program (The Center for Vocational Education, The Ohio State University, Columbus, Ohio, 1978) p. 6.

³John C. Coster and Patricia D. Poplin, AVA YEARBOOK, (American Vocational Association, Arlington, Virginia, 1978) Chapter 10.

⁴James Lewis, APPRAISING TEACHER PERFORMANCE, (Parker Publishing Company, Inc., West Nyack, NY, 1973) pp. 25-28.

⁵Richard C. Erickson, VOCATIONAL INSTRUCTION, (American Vocational Association, Inc., Arlington, Virginia, 1979) pp. 250.

⁶George A. Goens, "Phi Delta Kappan," (February, 1982, Volume 63, Number 6) p. 420.

ARTICLE

Developing Classroom Tests

One of the major tasks of an educator is assessing the achievement of objectives by learners. If we perform this task in a systematic and continuous manner for the purpose of making decisions, we are on the right track.

There are many factors to consider in evaluation, but this article focuses on developing classroom tests, primarily because tests are the most used evaluation tools in schools today. Checklists, observations, interviews, and other techniques are certainly useful, but for purposes of documentation and accountability, written or paper and pencil tests are essential.

Bases for Test Development

The relationship between objectives, instructional activities, and tests (Figure 1) forms the basis for effective evaluation. With learning as the focus, the objectives represent the skills expected of students and form the basis for instruction. All activities conducted in the classroom and laboratory should lead to the achievement of objectives.

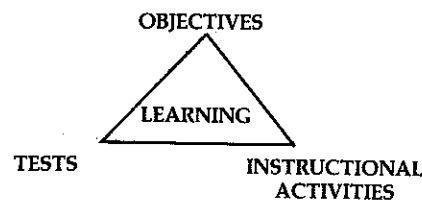
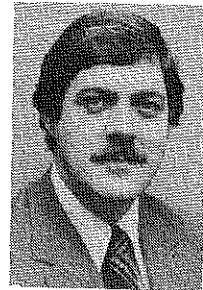


Figure 1: Relationship of objectives, instructional activities and tests. (From Morse, David T. THE PREPS TEST DEVELOPMENT CONSORTIUM TRAINING WORKSHOP, PARTICIPANTS' MANUAL, Mississippi State University, 1982.)

Test items, too, should be directly tied to the objectives, not only in terms of content but also level of difficulty. For example, if we have as an objective that "the learner will plan an insect control program for cotton," a test



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item asking the learner to "name harmful insects" is not congruent.

The reverse is also true. A lack of consistency in content or difficulty between any of the three parts of the model is serious, yet this is a very common occurrence. Many of the skills we say we want our graduates to possess are "higher order," decision-making skills, but we often fail to teach, provide practice, or test at that level.

Test Item Types

Tests are good if they consistently measure what they are intended to measure (the objectives) and if they communicate clearly to the learner. This can be accomplished with a variety of item types, with two common categories being "selected response" (true-false, multiple choice and matching), and "constructed response" (short answer and essay). Selected response items offer the advantage of being easier to score, allowing students to respond to more questions, and measuring desired skills only. The primary disadvantages are that the items are subject to guessing and require more time for development.

True-False Items. True-false items can usually be answered more quickly than other types, but are highly subject to guessing. Writers of such items

should be sure the item is absolutely true or false, avoid using specific determiners and double negatives, include only one idea per item, use a consistent marking system, and use more false than true statements.

Specific determiners allow the learner to correctly answer the item, even where the skill being measured has not been learned. Such determiners include "absolute" words like "all," "never," and "always." Qualified words such as "often," "maybe," "many," and "few" also tip off the test wise student.

The suggestion to use more false than true items is based on research which shows that students who guess on true-false items tend to guess true more often. Using more true statements than false gives an unfair advantage to guessing students.

Matching Items. When using matching items, provide clear and complete directions, provide matching sections with a maximum of ten or twelve premises, and provide more alternatives than premises or allow alternatives to be used more than once. If possible all the items in a section should be related, for example, a section on diseases and one on insects, rather than one larger mixed section.

Multiple Choice. Probably the most frequent used type of item is multiple choice. Rules for generating good items include making the statement clear and understandable, avoiding specific determiners, avoiding "hang-on" alternatives, avoiding redundant reading in the stem, placing sequential alternatives in logical order, and using logical alternatives.

Specific determiners give away the answer. They include making the correct alternative longer or shorter

than the others, using an alliterative association, and using grammatical cues.

An alliterative association is using an item stem which bears a resemblance to the correct alternative, for example, having "veterinary medicine" in the stem and including "medical" in the correct alternative.

Another type of error can be exemplified as follows: using biologist in the stem and having only one alternative with the word "study" in it. By knowing that ". . . ologist" means one who studies, the answer is given away without requiring the learner to know what a biologist studies.

Grammatical cues are often overlooked, with the most common being misuse of "a" and "an."

"Hang-on" alternatives such as "all of the above," "none of the above," and "a and c only" are usually used to equalize the number of alternatives. However, there is no compelling reason for attempting to have an equal number of alternatives on classroom tests. If "hang-on" alternatives are only used for this purpose, the practice should not be followed. If, on the other hand, there is a good reason for such alternatives, use them.

Short Answer Items. Rules to follow include providing unambiguous directions for students, stating items as precisely as possible, and preparing answer keys. Constructed response items offer the advantages of reduced guessing, measure writing ability, and are easy to prepare. They are, though, more time-consuming to take and score, more sensitive to scoring bias, and cover less content than selected response items.

Essay Items. Again, good clear directions should be provided, guidelines for responding and scoring should be used, and model answer sheets should be used to diminish scoring biases.

Improving Items

A high percentage of errors can be removed from test items by following two simple practices. One is to have a couple of fellow teachers to read tests to see if they are clear and understandable. At the same time we can implement the second practice which is to ask what they think the item is measuring. If they can state a reasonable approximation of our objective to which the item corresponds,

we probably have a good item. If not, it's time to revise or discard the item.

Checking Reliability

One characteristic of a good test is that it should be reliable; it should measure the same over time. If you want to check reliability on one of your tests, follow these procedures.

1. Develop a test, following the practices discussed earlier.

2. Give the test to a group of students, then calculate the mean or average score.

3. Allow two to three weeks to pass without reviewing the test or test scores and without teaching the material covered by the test. When you test the test you are not interested in measuring how much students have learned, but in the reliability of the test.

4. Administer the same test to the same students and calculate the mean.

5. Classify each student as follows. If any students did not take both tests, drop them from the analysis.

	Test 2	At or above mean	Below mean
Test 1	At or above mean	X	
	Below mean		Y

6. Add the number of students at or above the mean on both tests (box X) to the number below the mean on both tests (box Y). Divide this sum by the number of students who took both tests (N).

7. The result of step six is the estimate of reliability: (X+Y)/N. This figure can range from 0.00 (no reliability) to 1.00 (excellent reliability). A good classroom test should have an estimated reliability of .80 or more, using this method. If your result is not as high as you expected, there is a serious problem, analogous to measuring lumber for building a barn with a cloth tape that stretches and shrinks, never giving a consistent measure.

In such a case, you may improve reliability by adding more items to the test and by making sure the students clearly understand each item.

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Vocational Agriculture Aids American Farmers

Farmers feed people. This is a popular slogan which can be found stuck to the bumper of many a pick-up truck.

Closer examination of these words tells us that they are not just an opinion, but rather, a fact. Farmers do feed people.

According to a report compiled by the National Future Farmers of America Center Information Department, one farm worker supplies enough food and fiber for 68 people today. And this supply is not restricted to the people of this country. Of that 68 people, 48 are in this country, and 20 are in countries abroad.

Agriculture and farming are the number one industries in the United States today. Total assets from farming averaged \$927 billion for 1981. This is equal to 88 percent of the capital assets of all the manufacturing corporations in the United States.

With inflation affecting every aspect of American life, agriculture is the number one inflation fighter. Over the past five years, agricultural productivity growth has been five times greater than that of a non-farm industry.

Agriculture is the number one employer in the United States today. Almost 17 million people work in some type of agriculture. Farming alone employs approximately 4.4 million people. This is as many as the combined payrolls of the transportation, steel, and automobile industries. It accounts for one out of every five jobs in private business.

Anyone who has been grocery shopping is aware of the skyrocketing price of food. Well, once again, farming is number one in providing low food prices. According to a report by the National FFA Center Information Department, farmers receive an average of 39c for every dollar spent in the grocery stores of America. This is for the purchase of farm-grown food.

By MICHAEL DANNA

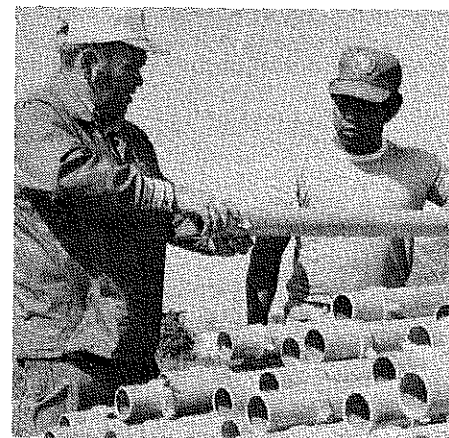
Editor's Note: Mr. Danna is a journalism student at Louisiana State University, Baton Rouge, Louisiana 70803.

However, it would be wrong to say that farming is all wine and roses. It is not.

Among the farmer's biggest problems is the erosion of top soil from productive farmland. According to Larry Michaud, Press Secretary for the Louisiana Department of Agriculture, Louisiana farmers lose 5.2 tons of top soil per acres per year. Michaud sees soil conservation as the key to reducing this problem.

The number of farms in this country is declining. However, the population of this country is ever-increasing. This means that fewer farmers will be feeding a greater number of people. And this decline of American farmers will surely effect the net income of farms still in existence.

In a recent report by Cotton Inc., the "farm ethic" among farmers is that



Educational programs help farmers be more productive. (Photograph courtesy of the National FFA Center, Alexandria, Virginia.)

they have an occupational satisfaction in the work they do. There is also stability of family life, religion, and the belief in the American system. It is evident that the attitudes of the farmer have not changed since this country was established. The farmer still has a pride and a love for the land and his work.

One of the things that has greatly aided the American farmer is the teaching of vocational agriculture. It begins at the high school level, and is combining the experience of the past with the technology of tomorrow.

Vocational agriculture is an instructional program that has a two-fold purpose. It contributes to the broad educational objectives of the public school system, and provides the education needed for employment in agriculture and agribusiness.

Vocational agriculture provides a basic education for high school youth who will later go into agricultural business occupations requiring an agricultural background, knowledge, skills, and abilities common to both agriculture and industry.

With the basic knowledge that vocational agriculture provides, young people who attend college, majoring in the fields of agriculture and agribusiness, can apply the knowledge that they have received directly to the processes of a farm. A young person whose parents are farmers and the owners of the farm, can partake in vocational agricultural and continue on to college in the field of agriculture, knowing that when he or she returns to the farm, he or she will be a great asset to the production of that farm. Through technical training, and the experience of the parents, the farm will surely be more productive. The combining of technology and experience will surely be the key to the success of American agriculture.

NGT to the Rescue

By

W. WADE MILLER
Editor's Note: Dr. Miller is Assistant Professor, Agricultural Education Department, Iowa State University, Ames, Iowa 50011.



Have you ever been frustrated while working in a committee or group? Does group work leave you exhausted and discouraged? Do you find that groups and committees often have a tendency to develop solutions before the problems are fully known? Have you ever been in a meeting where someone tried to dominate the discussion at the expense of the rest of the group? Do you feel that committee work often proceeds in circles? If you have faced any of these questions or problems the Nominal Group Technique (NGT) may offer one solution.

What is the NGT?

The NGT is a group process which has been used successfully by many organizations for program planning and decision-making. It was developed by Andre L. Delbecq and Andrew H. Van de Ven in 1968. They derived this technique from social-psychological studies of decision conferences, management studies, and social-work studies. Since that time it has gained wide acceptance in the fields of health, social service, education, industry, and governmental organizations. Basically, the NGT consists of the following steps:

1. Each group member silently generates ideas in writing.
2. Group members express their ideas in a round-robin fashion with each idea being recorded in a terse phrase on a flip chart or poster board.
3. Each idea is discussed by the group for clarification and evaluation.
4. Each individual in the group votes on every idea with the group decision being mathematically attained through rank-ordering or rating.

Uses for the NGT in Agricultural Education

The NGT can be used in a variety of ways with different groups and age levels. It can be used in planning of adult, high school and collegiate programs; to identify priority activities for the year; to delineate major program objectives; and to make decisions concerning the curriculum. High school

FFA chapters, young farmer chapters, and collegiate student organizations can use it to plan their programs, make decisions (such as which money-making projects are best), and to solve other problems encountered by organizations.

Guidelines for Conducting a NGT Meeting

Preparation. The leader or teacher should take care of some preliminary steps before the meeting. You will need a meeting room large enough to accommodate groups of five to nine members around individual tables depending on the number of people you expect in your meeting. The following supplies should be provided: a flip chart or large piece of poster board for each table, a roll of masking tape, a package of notecards for each table, a felt marker for each table, and pencils for each participant.

Starting the meeting. The leader or teacher should welcome everyone to the meeting, give them a sense of importance regarding their task, and indicate to them how their output will be used. Then, divide the overall assembly into smaller groups of five to nine members each. One way of accomplishing this is to have members number off (example: one to three for a meeting of 15-27 persons). The leader should then explain the steps in the NGT process.

problem is presented to the entire assembly by the leader, a speaker, film, or other means. Each subgroup can work on solving the entire problem or the problem can be broken down so that each subgroup solves a particular aspect of the problem.

Silent generation of ideas. For the first step, each group member writes key ideas or solutions on note cards silently and independently using short sentences or phrases. Enough time is allowed so that each member can record all of his/her ideas.

Round-robin recording of each idea. The second step involves the recording of group members' ideas on a flip chart or poster visible to all members of the group. The group will need to select a recorder at this time. The recording is done in round-robin fashion so that one goes around the table asking for one idea or solution from one member at a time. Proceed in this way until all of the ideas are recorded.

Discussion of ideas for clarification. The third step is to discuss each idea in order. Care should be taken to limit the amount of time devoted to discussion of each idea. The object of this discussion is to clarify the meaning of each idea; not to start or win arguments. The recorder allows all points of view to be shared, but then moves the group on to discussion of the next idea on the flip chart.

Voting on ideas. The fourth step is to vote on the ideas. It is suggested that a preliminary vote be taken first so that similar ideas may be combined or further clarified. Ask each member of the group to select from the entire list of ideas on the flip chart a specified number (example-five) of the ideas they feel are best. Have each one record each idea on a separate note card. After they have selected their priority ideas, have them rank-order the cards and record their ranking on each card. The recorder collects the cards, shuffles them and records the vote on the flip chart.

The results are discussed and some items may be combined by group consensus at this time.

A final vote is taken in the same manner as the preliminary vote. The final vote determines the outcome of the meeting, provides closure, and documents the judgement of the group.

(Continued on Page 20)

NGT to the Rescue

(Continued from Page 19)

Depending on the meeting, the recorder from each subgroup may present the decisions of that subgroup to the entire assembly.

Objectives of the NGT

There are several objectives of the NGT. One objective is to assure the opportunity for creativity through the idea generation step. A second objective is to give attention to each idea

and increased opportunity for each individual's ideas to be a part of the group's decision-making process. This is in contrast to conventional group processes where only a few members' ideas are considered and discussed. Finally, the democratic voting procedures provide a technique for arriving at a group decision.

The NGT is not a "cure-all" for group and committee work, but it does offer an alternative to the conventional small group meeting. If this alternative relieves some of the frustration,

eliminates dominance by a few individuals, and provides an efficient way to bring closure to a meeting; then it may deserve a trial. Try it, you may find that it is a tool you will want to add to your repertoire.

For a more complete description of the NGT process as well as variations of it, please consult this reference: Delbecq, Andre L., Andrew H. Van de Ven, and David H. Gustafson. Group Techniques for Program Planning. Scott, Foresman and Company: Glenview, Illinois, 1975.

ARTICLE

Achieving Articulation In Vocational Education

Is the track of your vocational programs obstacle free and characterized by continuity among programs? Is the student confronted with few insurmountable hurdles when transferring credits to similar institutions or advanced programs? How well do vocational programs reflect quality of planning and coordination? If you can answer in the affirmative to the above questions, then you may have a well articulated vocational program.

Few well articulated vocational programs exist nationwide. More often institutions offer a variety of vocational education programs with marked dissimilarity in entry level requirements and achievement standards. For example, in areas where secondary, postsecondary and/or college level vocational programs are offered, often a student entering any one of the institutions must enter the program at the first basic level. Prior preparation, knowledge or experience is disregarded. This lack of attention to the individual student limits personal motivation and defers graduation. Such problems of articulation in vocational education are yet to be resolved satisfactorily.

Recognizing the Roots and Current Day Inconsistencies

Many of the problems of articulation in American education are rooted in



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the eclectic nature of its institutions. For example, the kindergarten system is of German origin; the elementary school is Prussian; junior and senior high school system is American; the four year college is English, and finally, the graduate school has a German foundation (Russell and Judd, 1940). Added to this array are vocational schools, community and junior colleges, senior colleges, and a sundry of proprietary schools.

In addition, problems are magnified by the fact that American education is decentralized in spite of the universality of American education and its partial dependency on federal sources

as a common origin of funding. Little central planning or coordination of course offerings among different institutions or levels within the educational system is conducted on a national level. This is exemplified by the fact that some vocational programs are offered at secondary levels in one region and at postsecondary institutions (area vocational schools) in another location. There is little standardization in the criteria for referring to vocational programs as secondary or postsecondary. In some areas there may be some overlapping between similar programs which are offered at both secondary and postsecondary schools.

Another factor which contributes to problems in articulation is vertical and horizontal inconsistencies. Vertical inconsistencies arise from the lack of continuity in grade levels between higher and subordinate level institutions. Some higher-level institutions do not recognize the credits students have earned at lower-level institutions or may only accept a portion of the credits earned at the lower level. In some instances the requirements for admission to programs are unrelated to competencies necessary for successful completion of those programs.

Horizontal inconsistencies arise from the failure of one school or school system to recognize credits or experience acquired at a parallel institution or

school system. The increase in geographic and socioeconomic mobility of the population intensifies the need for both horizontal and vertical articulation (Gillie, 1974). With population mobility rates estimated as high as 50.9 percent within and among states, dependents of relocated officials may expect the admitting institutions to accept the credits earned at the previous institution.

Further, the diversity of philosophic goals and functional objectives among education institutions contribute to escalating the problems of articulation. Some institutions accentuate academic elitism while others stress equalitarianism among various curricula.

Improving Articulation Efforts

Most of the factors to which articulation problems are attributed magnify the need for harmonious planning and coordination of vocational programs among institutions. To this end, Act 208 Senate Bill 65, 1973, of the State of Louisiana was passed to provide for regional coordination and planning of postsecondary vocational technical education. This act established eight regions in the State. Each is headed by a regional director whose responsibility includes the coordination of instruction within the region. But even this arrangement appears limited to the

partial attainment of horizontal articulation within each region.

One approach was developed by the Dallas County Community District (DCCD) which recognizes a range of learning experiences outside of the traditional college walls. The DCCD awards college credits for course work completed at regionally accredited proprietary schools; and, also for business, industrial and military programs recognized by the American Council on Education. Again, a potential student may petition for, and earn, credits for practical work experience, or for active professional certificates, licenses or credentials in recognized professions. Further more, formal or informal life experiences receive equivalent college credits provided that these learning activities can be associated with the competencies of DCCD's courses (Lindahal, 1982).

Other school systems have approached articulation in vocational education by the establishment of a single board or unit with responsibility at state level for planning and management of all education programs. Actually this may be centralization of state education, similar to that characteristic of European countries. An alternative to the aforementioned suggestion may be a body or board empowered with specific authority for coordinating

selected activities. The actual day to day management of the institution would remain with the local bodies with only articulating and quality control standards set by this authority. A third suggestion for improving articulation is to coordinate programs among schools or systems in a defined geographic area by establishing a voluntary system of representatives from participating institutions.

Determining Educational Articulation in Vocational Education

Although the suggested steps toward addressing articulation result in reduced autonomy among institutions, they may increase the usefulness of the institution to the student. After all, educational institutions are expected to both meet student needs and to recognize the value of business and industry. Can vocational education allow the process to interfere with the product to the extent articulation grows as a problem or will the problem be addressed well and a solution be provided? A team effort can yield a greater harvest than single efforts! Thus, poor articulation creates an obstacle in vocational programs, but a well articulated one enhances student development, promotes public relations, provides relevant and feasible curriculum while it addresses the urgent needs of students and educational institutions.

Whether you have a well articulated vocational education effort or one less than is possible where you are, the final obstacle is self. What is determined for articulation efforts may depend on you. How you meet the challenge of the obstacle course route, including self, is one decision which should not be made lightly. Your vocational program is an important part of any articulation endeavor!

Gillie, A.O. PRINCIPLES OF POSTSECONDARY VOCATIONAL EDUCATION. Ohio: Merrill Publishing Company, 1974.

Lindahal, D.G. Giving students credit for what they already know. VocEd, 1982, 57, 44-45.

Morphet E., Johns, R., and Reller, T. EDUCATIONAL ORGANIZATION AND ADMINISTRATION. New Jersey: Prentice-Hall, Inc., 1967.

Russel, J.D. and Judd, C.H. THE AMERICAN EDUCATION SYSTEM. New York: Houghton-Mifflin, 1940.



Constructing A Square Tubing Bender

A square tubing bender is essential in a vo-ag program where construction projects involve using square tubing. The tubing bender described in this article is primarily used for bending bows for livestock trailer racks.

The bender is constructed from two standard transmission flywheels. Cogs on the rim of the flywheels must be removed. The flywheels are bolted together with the face to the inside. Shims may be needed between the flywheels to allow enough space for the square tubing. Flywheels are welded to pipe or plate metal and secured in a vice during operation.

The handle can be made of pipe and designed to fit the flywheels selected for the bender (additional cheater pipe may be required to make the bender).

By PHILIP FUSS

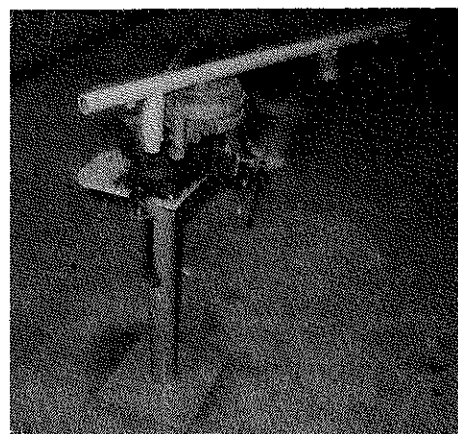
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The handle pivots from the center of the flywheel by welding a pipe to the handle which will fit the center hole of the flywheel. The press roller may be made from pipe and welded to the handle.

Before pipe is bent, a starting point must be established on the flywheel (approximately 1 inch from holding bracket). An allowance must be made

in the length of tubing to be bent. From the first bend, subtract 5½" from the designated starting point and add 2¼" to desired overall length to the second bend.



BOOK REVIEW

PLANT BREEDING AND GENETICS IN HORTICULTURE, by C. North. New York, NY: Halsted Press, 1979, 150 pp., \$14.95.

The nine chapters cover all aspects of plant breeding in horticulture. The Mechanism of Inheritance chapter gives in simple and precise form how mitosis and meiosis occur. The illustrations are excellent. Chapter two is entitled Chromosome Number. It deals with the various examples of ploidy and how they occur.

The next chapter, Flower Form and Pollination, gives the steps in pollinating flowering plants. Mr. North also relates some of the problems and solutions with self-pollination, and cross-pollination.

Chapter four, Fertilization and Seed Development, contains good botanical illustrations that any layman can understand. The problems of incompatibility, seed treatments for good germination, and embryo culture are discussed in this chapter. Chapter five, Segregation and Combining Ability, uses simple but concise terminology in presenting this material so that students can fully appreciate it.

Mutations is a very short chapter in

which excellent explanations of natural and artificially induced genetic changes are given. Cultivars that are propagated by vegetative means are discussed fully in Chapter seven. Common fruits, vegetables, and ornamentals are also discussed.

Plants that are "Seed Propagated Cultivars" give Chapter eight its title. The problems, techniques, and solutions to working with these vegetables and ornamentals are related in good detail. Chapter nine concentrates on the selection, introduction and maintenance of new cultivars. The registration and rights of plant breeders (in

Britain) are given.

Mr. North's book is an excellent reference tool. It can be used by the backyard plant breeder because of its preciseness and simplicity. This text could be used with second year high school horticulture students. College students enrolled in plant breeding courses definitely should own a copy. A delightful book to read for someone interested in breeding horticultural plants.

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1983 THEMES

The Agricultural Education Magazine

February	Achieving Quality Relationships with Business/Industry
March	Achieving Quality Supervised Occupational Experience Programs
April	Achieving Quality Programs with Decreasing Resources
May	Achieving Quality Summer Programs
June	Achieving Quality Program Supervision
July	Achieving Quality Teacher Education Programs
August	Achieving Quality Adult/Young Adult Programs
September	Achieving Quality Laboratory Projects
October	Achieving Quality Student Organizations
November	How Others Perceive Us
December	Assessing Student Performance

THE COMMERCIAL GREENHOUSE, by James W. Broodley. Albany, New York: Delmar Publishers, 1981, 568 pp., \$12.95.

This is a comprehensive book, offering a wealth of information on general aspects of greenhouse production as well as the culture of individual crops. A section on the floriculture industry in general opens the text, discussing domestic production, competition from abroad, and opportunities for employment in the field. Though devoted to the production of flowers and some foliage, the sections on growing structures, media, and propagation are also relevant to other types of crops.

Broadly applicable is the section on environmental factors which affect plant growth. This includes practical

chapters on the plant itself, light, temperature, and gases. A section on nutrition and watering is up-to-date, and does not shy away from discussing specific products or companies.

There is no chapter covering pest control, but the subject is well treated throughout the book. Devoting little space to support structures such as shade houses and cold facilities, the text sticks firmly to its title, and the crops normally grown in greenhouses.

Much of the book is dedicated to cultural practices for specific crops. One section covers those plants which are normally grown in containers, including flowering pot plants, bulbous species, tropical foliage plants and bedding plants.

Three chapters are devoted to cut flower crops. The book ends with

chapters on harvest and storage methods, the wholesale flower business and retail outlets.

Student objectives are listed for each of the 31 chapters, and each chapter ends with a set of multiple choice questions which could be used for review, testing or discussion. A useful feature of the glossary is its division into nine parts, one for each section of the book. The vocabulary of the text is fairly advanced, aimed at experienced secondary students or those at the community college level. Too involved for a beginning course, this comprehensive text would prove useful for any student serious about greenhouse production of flower crops.

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BOOK REVIEW

ARE PESTICIDES REALLY NECESSARY? by Keith C. Barrons, Chicago, Illinois; Regnary Gateway, Inc., 1981, 245 pp., \$6.95.

ARE PESTICIDES REALLY NECESSARY? is an interesting, informative, and realistic overview of the usefulness of pesticides in our environment. The book is divided into three sections.

Section I addresses the issue "Why Pests Have Not Overwhelmed Us." Emphasis is placed on how nature provides our environment with a defense against pests, predators, and parasites. The development of new disease free seed varieties or hybrids has assisted in combating many diseases. Importation of selected species of insects has aided man in controlling harmful predators. Farming practices such as crop diversity and rotation have helped in reducing the severity of pests.

Overall, Section I provides some interesting insight into some myths that exist concerning growing plants and

how pests may be controlled. The use of facts and examples makes for interesting reading. Integrated Pest Management (IPM) is identified as the most practical means to keep pest populations below the threshold of economic damage.

Section II is entitled "The Pesticide Drama." The impact of seed protectants on crop production stability and the economic benefits resulting from seed protectants are discussed. Crop and animal production in the United States is a product of better breeding and improved pest control. Factual information is provided concerning environmental reasons why nitrification inhibitors should be utilized with ammonia fertilizers. Emphasis is placed on environmental and chemical practices as necessary components in protecting our health.

Section III, entitled "Pesticide Safety" deals with concepts, controversies, and controls. Chapters 29 and 30 highlight the chemistry and toxicology

of many elements in the environment. How pesticides are regulated in the United States and international cooperation are lightly covered. The question of human health and pesticide controversies are reviewed from a trade-off approach. Data concerning lethal and nonlethal accidents are discussed as related to the type of poisonings.

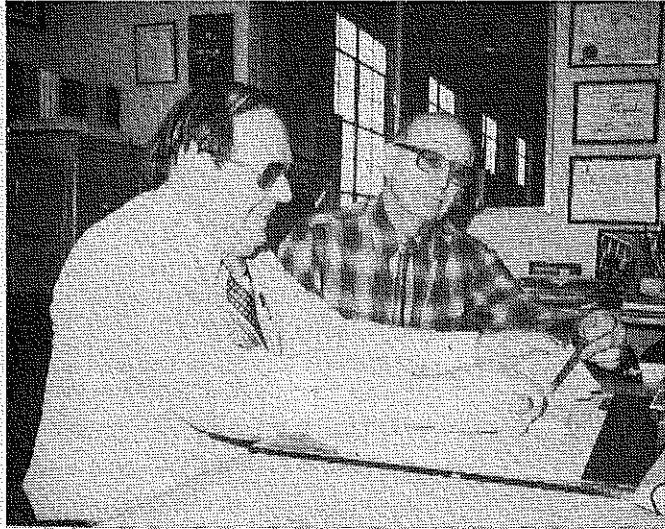
Integrated pest management first line of defense is pesticides. The author concluded that there are trade-offs, but "YES, Pesticides are Really Necessary."

Dr. Keith C. Barrons expertise as a plant breeder and personal experiences in pest control is reflected in his book. **ARE PESTICIDES REALLY NECESSARY?** would be a very good teacher reference to provide vocational agriculture teachers with insight into the pros and cons of pesticide use.

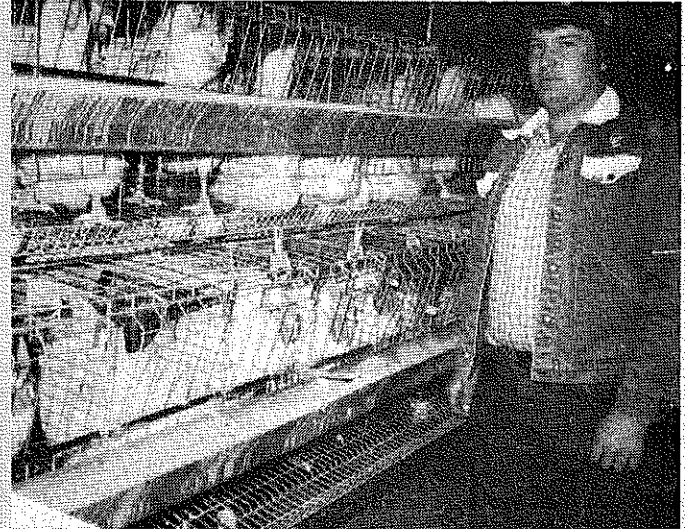
Fred Reneau
Southern Illinois University
Carbondale, Illinois

Stories in Pictures

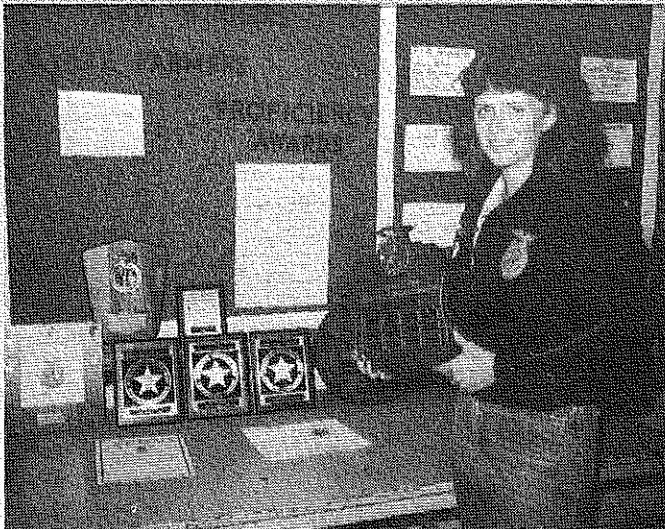
Evaluation may occur
in a variety of situations . . .



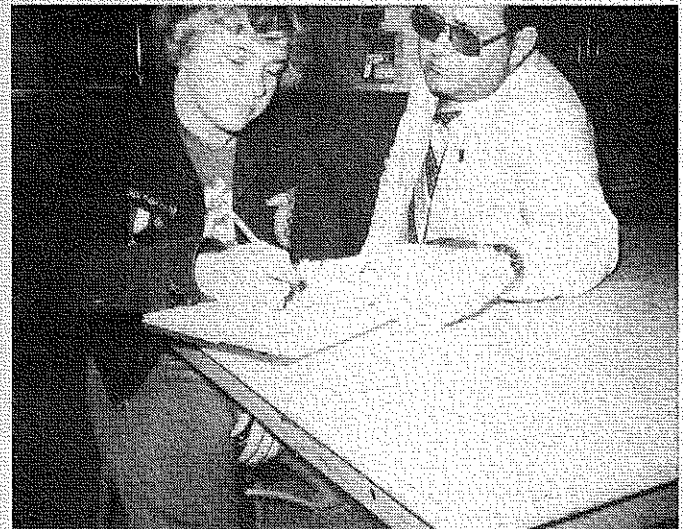
Consultation by supervisor with teacher. (G.W. Hamby, right, District Supervisor in Missouri, is reviewing Jim Howard's work at Mt. Vernon, Missouri.)



Placement of students (all photographs courtesy of G.W. Hamby, Missouri.)



FFA Events



Supervised Occupational Experience