Effective Teaching

Student Learning Styles

Effective Laboratory Teaching

Motivating Students
Teacher Behaviors and Methods That Make a Difference

Teaching is so complicated. Too bad we can’t just zero in on a few things and then tell our students that our teaching is solid and our students are learning. With plants it’s much easier to predict the effects of a particular treatment; more fertilizer generally means increased yields. Water stress means poor crop performance. Plant responses are due to biological and physical processes (reactions). But teaching is different. The same amount of encouragement might make Johnny talk more, but Sally won’t talk off in her learning. What works like dynamite for one student can be a dud for another. So we must try our best to find the right combination for each student.

Effective teaching means teaching each student effectively.

Research has shown that there are some powerful determinants of effective teaching. Most of these are very familiar to the seasoned teacher. The challenge is to find a way to incorporate most or all of these effective teaching strategies in our everyday teaching.

Cues, engagement, corrective feedback, and real reinforcement are strongly associated with improved student learning. Cues indicate to students what they should learn and how learning should proceed. Brief overviews (organizers), goal setting, hierarchical learning (easy to complex), and pretests are very effective cues. Engagement refers to the extent that students participate in learning activities. Not surprisingly, the more students participate, the more they learn. Corrective feedback is aimed at correcting errors and/or written errors. Effective teachers correct errors quickly and often follow by explaining or providing additional engagement time. Reinforcement can take many forms and serves to inform students about their effectiveness and opportunities for improvement. One study found that teachers who extensively used cues, engagement, corrective feedback, and reinforcement had students who scored one to two grade levels above other students. WOW!

Other significant findings about effective teaching are consistently appearing in the research literature. Teachers with higher expectations have higher achieving students. Frequent and varied instruction is important. Questioning is one of the most pervasive techniques that teachers use. How teachers respond to student questions and answers has much to do with determining teaching effectiveness.

Homework has been a major source of frustration for many years. However, if students do homework, engagement is increased. Graded homework that is promptly returned with corrective feedback has been shown to advance students over one-half grade level above their peers who do not participate in homework. Home interventions designed to improve student learning in the home (like our SAE program visits) have been found to have a similar effect.

Inquiry teaching, where students formulate hypotheses and conduct laboratory investigations, substantially improves student learning, particularly in the area of scientific processes. National Science Foundation studies have shown that giving students opportunities to do science, to explore on their own, to contrast with teachers about what they will learn, and to participate in an activity-based curriculum all have substantial positive effects on student learning.

Research has shown that students learn more when they are being taught or supervised by their teacher as opposed to working on their own. Personal involvement of the teacher in each student’s learning increases achievement. Teacher talk in this case is not primarily lecture, but rather feedback on discussion, demonstrations, questioning, providing feedback, and the like. Personalized instruction has been shown to advance students as much as one-half grade level above their peers. When teachers explain class and homework assignments and go over examples before independent student practice, learning is enhanced. More students work, corrective feedback, and reteaching are all important in promoting effective teaching and learning.

Students learn more when the subject matter is well organized/structured. The use of outlines, smooth transitions, and summaries increases student learning. A certain degree of redundancy has been found to have a positive effect on student learning. Teacher clarity and enthusiasm is associated with greater achievement.

Making gains in our teaching effectiveness requires that we reflect on our teaching (continued on page 22).
Effective Teaching: What Is It?

Effectiveness can be likened to success and may be interpreted differently, depending upon one's profession. To a business person, effectiveness or success might be measured by profit made. To an athlete it may mean performing at his/her best, contributing to winning as a team, or excelling individually. To a manufacturer it may mean producing a certain number of quality products. To an agriculture teacher it should mean producing students with skills, knowledge, and attitudes necessary to succeed in postsecondary education or the workforce.

What is effective teaching? Educators have been engaged in this type of conversation for a number of years. Rowe (1971) and Purtz (1971) were among researchers who described teacher behaviors leading to higher student achievement. They reviewed 50 studies to determine if there were common variables (practices) used by teachers leading to the attainment of student achievement. They found that teacher clarity, use of variety, enthusiasm, use of business-like procedures, informing students of intended criteria, minimizing criticism, offering appropriate praise, and using positive reinforcement were teacher behaviors contributing most to student achievement.

In a previous edition of The Agricultural Education Magazine, Larson (1992) suggested that when assessing the teaching effectiveness of an agriculture teacher some aspects such as knowledge, use of subject matter, variety of teaching methods, linkage with real life examples, classroom control, and student motivation should be considered. Scott (1992) reported that elements contributing to a positive teaching-learning environment are professionalism, preparation of the students to learn, using clarity in teaching, providing immediate feedback, holding students' attention, asking questions, enthusiasm, and accessibility.

To me, teaching effectiveness is obtaining desired results. It is detecting our students to achieve intended learning outcomes or objectives. The teaching behaviors reported by the authors cited previously are those found to obtain desired results.

How do we know what the results or outcomes should be? If we are preparing students for careers in agricultural occupations, then the outcomes should be those which are demanded by the industry. We determine those outcomes by working with people within the various agricultural occupations and ask what is required to carry out their jobs. This is the basis for a competency-based program.

The identified required tasks can then become the basis for developing the content of a program. The instructional planning process begins with determining what the outcome should be, and working backwards to determine what content, activities, and teaching methods are used to obtain the desired results. Let's assume that for a horticulture program it has been determined that 'prune shade and ornamental trees' is a task that should be learned (desired outcome). The task can easily be written in the form of a terminal behavioral objective, including the acceptable level at which the students must perform the task. From this, enabling objectives can be determined, based upon what the teacher thinks the students need to know and be able to do in order to acceptably prune a tree. When the students can meet the objective, or acceptably perform a shade or ornamental tree, they have met the desired outcome, and an effective job of teaching has been accomplished.

How can this process contribute to effective teaching? First, if effectiveness is obtaining desired results or outcomes, the teacher must know what outcomes are expected in the industry. Knowing the outcomes enables teachers to more easily direct students to the competencies desired within the industry. Secondly, if students know the desired outcomes and criteria for success, they will more readily attain them, resulting in a greater degree of effectiveness. Thirdly, teachers can still use the behaviors identified by Scott (1992) with the understanding that elements contributing to effectiveness as they lead the students toward attaining the desired outcomes. In conclusion, effective teaching is using the various behaviors or practices necessary to obtain the desired results. The desired result is produced by preparing competent students that can be successful in their chosen path in life. I believe agriculture teachers have been effective and will continue to be effective because they know about the desired results.

References

Student Learning Styles and Effective Teaching

How many times, as an agriculture teacher, do you hear students say things like, "I can't get this," or "How do you figure that again?", or "Will you go over that one more time?" When you work hard to plan a good lesson and a few students really struggle and don't catch on, does it make you wonder why? As a teacher, do you ask yourself questions? Why didn't they get it? What did I do wrong? What should I do? Perhaps our first thought, as teachers, is to blame. By asking questions like those above, what we are doing is blaming someone, either those students or ourselves. Finding fault may not be the most accurate way to solve the problem. A better approach is to find the solution. Perhaps the solution may be found by looking into the teaching-learning process and recognizing that the way teachers teach affects how much students learn. Similarly, the way students learn affects how much they learn.

As a teacher, do you ask yourself questions? Why didn't they get it? What did I do wrong? What should I have done?

Learning Style

Teachers take subject matter areas very seriously and constantly make efforts to keep current in both science and technology. A good deal of professional time and effort is expended on in-service education activities in agricultural education. As teachers, we invest a good deal of time thinking about and preparing for what we should teach. Likewise, we should spend an equal amount of time thinking about and preparing for the learning styles we should teach. We have tried to design courses that meet the needs of all students. Research indicates that students learn in a variety of ways, and the predominant and preferred learning styles can be profiled (Srokes, Cox, and Srokes, 1981). One of the earlier studies which reported results of research on learning styles of students in vocational agriculture indicated that important variations in learning styles were observed between students from rural and urban schools (Cox, Srokes, and Srokes, 1981).

Research suggests that learning style is an important influence on a student's choice of learning strategies, and that both styles and strategies affect learning (Oxford, 1989). Hodges (1983) noted the link between learning and teaching and how ineffective teachers learn faster and with less effort when they are taught through their individual style. In many instances, teachers tend to use a single style approach or teaching style with all students, expecting them to succeed, yet stressing conformity and overemphasizing individual learning preferences (Bowen and Yong, 1992).

Additional research in agricultural education is continuing to reveal more about how students learn, as well as how teachers teach. Recent research in Ohio (Cain, Garton, and Raven, 1992) and Montana (Raven, Cain, Garton, and Sheehaner, 1993) compared learning styles, teaching styles, and personality types of preservice teachers of agricultural education. Similar results were obtained in two studies that identified intriguing and perplexing questions regarding relationships between teaching and learning. In both cases the teaching styles used were similar to the way teaching was conducted in previous years. Teachers in Pennsylvania (Rofflro and Scanlan, 1989) measured learning styles and developed a distance profile of students in secondary agricultural programs. A lot of time and effort is being expended by some researchers into the learning styles. Some practical questions which should arise from a teacher may be: So what? or How can I use this information? In other words, what is the application of this research to a local agriculture program? As with any body of research, it is ultimately of value to the utility of the results in actual practice. Not everyone wants to be, or should be, a specialist in learning styles. But results are some aspects which have direct use for a local teacher. As a teacher who may have some interest in putting some of the results to use, it is important for you to be informed as well as the limits of learning style information.

Diagnosis of Learning Styles

Critical to the application of learning
Effective Teaching in Agricultural Mechanics Laboratories

Effective teaching in the agricultural mechanics laboratories begins by teaching the competencies needed by students. Selection of these competencies should be based on the needs of the community, state, and region. Employment demographics and opportunities often influence these needs.

Students may not always view these competencies as an important part of their high school education. A "felt need" must be developed in the student before effective agricultural mechanics instruction can occur.

Several teaching methods and management activities facilitate effective agricultural mechanics instruction. The selection of the projects that students will construct, the tools that are available for students to use, the knowledge of the instructor, inservice opportunities for the instructor, arrangement of the facility, the storage of equipment, the lessons planned, the rotation of students from one skill area to the next, and the control of the agricultural mechanics environment all impact the teacher's effectiveness in the agricultural mechanics laboratory. This article will discuss each of these topics briefly.

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Projects
Are you selecting required projects that keep your students busy, or are you requiring projects that teach the competencies needed by your students? Students and parents quickly differentiate between projects that are "busy work" and projects that develop needed competencies. Therefore, are you providing a variety of opportunities for your students, or did your students' parents construct the same project 20 years ago?

These two examples accentuate the importance of selecting a project that meets the intellectual needs of your students. When students see a valid reason why the project is natural work harder, and their parents provide behind-the-scenes support that is essential for effective agricultural mechanics instruction.

Tools
The tools used for agricultural mechanics instruction should be selected based on the competencies needed by the student. The quantity and quality of tools should be furnished to facilitate instruction of these competencies. The balance between quality, quantity, and cost of tools for your students can be a difficult decision that influences effective teaching. The quality of your tools, not the quantity of tools, should be emphasized. High quality tools last longer, are less frustrating to use, and are more productive when using these quality tools. If support dollars are short for tools, a rotational scheme should be incorporated that allows adequate time for students to learn how to use each respective tool as they master each competency.

Instructor Knowledge/Inservice Opportunities
"We teach what we know" is often discussed in educational circles. This should not negatively affect the ability of your students to master the competencies needed. If the agricultural mechanics competencies needed by your students are not your strong suit, seek inservice opportunities that will allow you to feel comfortable as you address these competencies.

Inservice can and should be gained through both formal and informal instruction. Opportunities include National Council inservice, local agricultural mechanics "inservice" series that have been available across the nation. Companies such as Briggs & Stratton, Case IH, DEERE & CO., Blue Bird Electric, and Miller Electric all sponsor workshops for teachers at their factory training schools. People in these communities are also an invaluable resource that should be called upon to supplement and foster effective agricultural mechanics instruction.

Arrangement of the Facility
A floor plan should be laid out on paper that outlines all the devices, spots, and ventilation ducts (in other words, items that would be expensive to relocate). Work areas should be laid out in a manner that minimize movement and promote safe instruction and effective teaching. If needed, tools should be relocated within the respective work areas of the agricultural mechanics laboratory.

The Group Embedded Figures Test (GEFT) (Witkin, Olman, Raskin, and Karp, 1971) uses simple figures embedded in a complex drawing to assess analytical versus nonanalytical skills of information processing. It is a non-verbal, perceptual test, and is appropriate across cultures. Subjects score above the group mean are considered analytical or field independent. Those subjects who score below the group mean are considered non-analytical or field dependent. Field independent learners are typically more internally motivated and have more cognitive flexibility than field dependent learners, who are globally, externally controlled, and not very good at organizing and comprehending material. This instrument is short, easy to administer, self-scored, and can be used with a broad variety of ages.

The National Association of Secondary School Principals (NASSP) Learning Style Profile (LSP) (Kolb, 1984) measures an individual's relative emphasis on concrete experience, abstract conceptualization, active experimentation, and reflective observation. The LSP indicates the extent to which an individual's preferred style is abstract versus concrete or active versus reflective. This test is short and easy to administer, either individually or in large groups, and is self-scoring. It is a self-inventory and may be subject to inaccurate self-reporting. This learning style instrument is most appropriately used with adults and may have application in an adult education program.

Learning Styles Inventory: A Measure of Student Preferences for Instructional Techniques (Renzulli and Smith, 1979) is composed of 65 items which are designed to measure student attitudes toward nine general modes of instruction. The nine specific modes are projects, drill and recitation, peer teaching, discussion, teaching games, independent study, programmed instruction, field trip, and demonstration. A teacher test is included and designed as a tool for teachers to evaluate the range of instructional techniques used in the classroom. This test is designed to be used by grades 4-12, and is easy to read and administer. This is self-inventory and is subject to inaccurate reporting, either intentionally or unintentionally, by the subjects.

The next time you encounter students who work best in situations where they are cooper-
The Challenge of Motivation

In business, the customer is always right, and the treatment of that customer determines the success of the business. In agricultural education, the challenge of motivating the student determines the success of the curriculum.

The presentation of the curriculum to students does not necessarily result in learning. Just because you think students should want to know about certain topics does not mean they will be motivated to learn. They don't necessarily learn what you think is important. Therefore, it is important for you as an instructor to create a desire to learn in students.

In business, successful firms always greet their customers in a cheerful, positive, sincere way. Teachers must greet their students the same way. You must determine what the students want to know and guide them to the realization that there is no need to know the information you are presenting. Teaching is a constant selling job, just as a business must continually sell its product or service.

TV commercials often depict their product with excitement, and action. Teachers also need to be excited about what they are teaching. If you are excited about a topic, that enthusiasm will transfer to the students, and they will become interested in learning about the topic.

The curriculum must be relevant. Students today are sophisticated. They are not interested in learning unimportant facts that may already be outdated. We are living during the time of modern technology which will supply facts in microseconds. For example, when teaching agricultural credit, we are aware that not every agricultural student will be a farmer or agric和平ness person, but the fundamentals are important to all consumers.

In business, successful firms always greet their customers in a cheerful, positive, sincere way. Teachers must greet their students the same way.

I have found that involving students in FFA is one of the best motivating devices. If I can get students involved in an FFA activity, their interest and performance in the classroom often improve. All types of FFA activities can be effective. Judging team competition and exhibiting livestock and crops are the most common, but activities such as community service, recreation, committee meetings, chapter leadership, and Greenhand camps are also good ways to get student excitement about learning.

When students are active in FFA, they develop friendships, are possible activities they can participate in, develop self-confidence, and create an interest in agriculture. All of these opportunities result in improved interest and success in the classroom. Success breeds success, and students often improve in other classes because they have set goals and now have direction.

Several years ago I wrote an article for The Agricultural Education Magazine entitled "Let's Not Forget Those That Want to Farm." Although many years have passed, I still adhere to that theory. However, times have changed, and agriculture instructors must also change.

The principles of farming in Pipestone, Minnesota, still center around beef, sheep, swine, dairy production, corn, and soybean crops. But the principles of this type of farming are the same as the production of trees, flowers, vegetables, small animals, and even aquatic life. The specifics are different, but the principles are the same. Selection breeding, feeding, growing, disease control, and marketing are all factors in production.

There is no magic formula to motivate students, but a sincere interest in them and their achievements is probably the key to success. If you have this, you will incorporate all of the other teaching and technology into a process of learning "how to learn" which they need to succeed in the career of their choice.

Coming in December...

Theme: Teaching Academically Disadvantaged Students

- Using learning centers
- Georgia's Lanth Project Adoption Program
- Teacher Expectation

Plus other topics and feature columns.

Effective Teaching of Agriscience Through Cooperation and Resource Sharing

Studies have shown that integration between subject areas and teacher collaboration across disciplines can strengthen teaching effectiveness and increase student learning. Rogge and Russell (1988) conducted a study to determine how well agriscience and biology can be integrated in a high school setting. They found that the integrated approach was superior to the traditional approach in producing higher overall achievement. Alley (1984) reported that experts agreed that the process of education should assist students in thinking, being a facilitating process. They also endorsed less lecture and increased opportunities to integrate academic theory and real-life learning. The California High School Task Force stated in Second to None: A Vision of the New California High School (1992, p. 7), "If we have learned anything about educational reform during the decade of the 1980's, it has been that single initiatives cannot simply operate in isolation." They recommended that students "choose an organized program around a special focus that combines academic, applied academic, and field experiences" (p. 23).

The AgriScience Institute and Outreach Program is a three-year project funded by the W.K. Kellogg Foundation through the National FFA Foundation and The Council. The Program was designed to bridge the gap between agriculture and science education and is testing a model to integrate agriculture and science education in a variety of high schools across the United States. A specific objective of the program has been to increase the teaching effectiveness of agriculture and science teachers through resource sharing and collaboration. The program model focuses on increasing resource sharing and collaboration between agriculture and science teachers in two phases.

The first phase comprised the selection of 10 agriculture and science teacher teams from the same high school districts across the United States. Teacher teams ranged from having a strong relationship to hardly knowing each other at the beginning of the program. During the Institute, the teacher teams worked in collaboration with university researchers to develop agriscience instructional materials. In the fall of that same year, the teacher teams returned to their classrooms to work together and field test the instructional materials that had been developed.

A specific objective of the program has been to increase the teaching effectiveness of agriculture and science teachers through resource sharing and collaboration.

The second phase of the program comprised a two-day workshop at the University of California, Davis. The purpose of this workshop was to prepare teachers to conduct workshops in their region of the United States. In the spring, summer, and fall of 1992, a total of 63 Outreach Workshops were conducted in the continental United States and in Alaska. This model was repeated in 1993-94, and another 60 plus workshops have been conducted throughout the United States and Hawaii.

The AgriScience Program focuses on the process of learning, rather than the end product; the journey rather than the destination. The materials stress the inquiry approach to student learning. Students are not handed information to memorize, but rather they are asked to investigate a variety of scientific principals related to real agricultural problems through laboratory experiments. Teachers do not provide answers, instead they help students develop the skills to find the answers themselves. An interesting off
**Knowing the Student and the Subject Matter**

Knowing the target — Bull’s Eye: Zig Zigler exclaims as he tells the story of the great archery champion Howard Hill. A more contemporary version might be — "Howard Hill knows archery." Do you know teaching? Classroom instruction is the foundation upon which supervision and student organizational activities are developed. What happens in the classroom sets the tone for the development of skills and competencies which lead to gainful employment or future career goals. Does it make a difference when the teacher who possesses the imagination and commitment and teachers give their very best in order for their students to excel? You already have the answer. We can no longer afford the "luxury" of students in this country completing educational programs unprepared to face the realities of life. Where then do we start?

**Knowing the Student**

To establish a positive learning climate in your classroom today, it would be well if you knew the students on a first name basis and called them by their first name. When called on in class by their first name, especially for questions which they know the answers, students' self-worth is enhanced. Calling people by their first names with a positive tone in your voice is the ultimate compliment you can pay those people. It sends a signal that you like them and you respect them.

Knowing the student on a first name basis is a starting point. What else do you know about the student — classification, age group, gender, interest, background — rural or urban, work experience, career goals, and the like? If you know the students and their background, can you do a better job of preparing for today's lesson? Yes, a resounding yes! Having the opportunity to know the students allows you to do a better job of preparation, because you not only know them, you have an understanding of their needs, goals, and interests. This allows the teacher to do a more effective job of introducing the lesson and personalizing it to capture the students' interest and imagination. If the students can themselves achieve goals or being successful then we have succeeded as teachers. Introducing "today's lesson" and using the appropriate interest approach is difficult under the best of circumstances. What would it be like if you had no prior knowledge of the class?

**Knowing the Subject Matter and How to Teach It**

As human beings, teachers tend to teach what they are familiar with and enjoy. Knowing the subject matter not only lends itself to understanding what teaching methods to utilize (and there are many in agriculture), but also the kinds of questions which can be asked from and from which ideas can be stimulated. If the teacher understands the subject matter, generally there will be an "air of excitement" pervading the classroom, which will enable the teacher to observe, hands-on activities in which to involve students, projects, and appropriate real-life examples. Furthermore, the teacher will feel comfortable in asking probing critical thinking/problem solving kinds of questions, as well as higher order questions, which require one to develop and think through a similar scenario to solve the existing problem.

To prepare for the next step in teaching today's lesson we must decide ahead of time the lesson title, how we were going to introduce it, and the interest approach we plan to use. Now it's time to decide not only how we are going to teach the subject matter, but "what do we want the students to learn and how well do we want them to learn it?" Finally, the question, what are the objectives of today's lesson and what will be important for students to remember and be able to utilize? In addition to being able to articulate the objectives and use a particular teaching method effectively, what instructional aids and supplementary materials will be appropriate for this particular lesson? And now let's put "the icing on the cake" — did you summarize the high points of the lesson and bring it to finality?

**Conclusion**

We in agriculture are indeed fortunate to teach a subject matter which lends itself to so many different teaching methods. In teaching agriculture we are teaching the science of life. It's exciting! There is something about seeing the beginnings of new life, developing a new skill, applying a new practice, and achieving a goal that brings out the very best in our students. Understanding students and the subject matter allows teachers the opportunity to develop...
Effective Teaching in... mechanics laboratory to ease project construction. Consumable supplies should then be rele-
ated to minimize student movement (within limits of safety). Projects should be moved pro-
gressively closer to the exit after each construction phase is completed. If planned correctly, the project should be setting the exit just before completion.

This type of planning minimizes the need for excessive student movement in the labora-
tory. Minimizing student movement and locating tools near the areas of their use in the agri-
cultural mechanics laboratory helps keep students on task during the learning process. It also promotes a safe and effective teaching environment for you as a teacher.

Tool Storage Tools that are common to a given task should be stored in the appropriate work area of the agricultural mechanics laboratory. Examples include sandpaper and welding equipment. Sandpaper should be stored near the paint/dusting area of the laboratory. Welding-related tools should be located near the welding area of the agricultural mechanics laboratory.

Proper tool location minimizes student movement and allows for most effective use of the agricultural mechanics laboratory, and facilitates effective teaching.

Lesson Planning Agriculture teachers are sometimes criticized for simply "taking the students to shop." Teaching, all too often, is to happen find that their students master competencies at a pace that is slower than expected. Much structure is needed for agricultural mechanics laboratory instruction. Units must be planned well in advance, and classroom discussions must focus on the knowledge and competencies to be learned. Demonstrations must be planned and delivered to maximize student learning and retention. Agricultural mechanics laboratory instruction requires as much thought and planning as preparing for a classroom learning activity.

Rotational Management Effective teaching can be accomplished with limited tools and equipment. Under those cir-
cumstances, a student rotational plan, where students spend a predetermined amount of time in one area of the lab and then systematically move to another work area, may be appropri-
ate. A laboratory activity book facilitates the use of a rotational teaching plan. The labora-
ry activity book should contain specific objectives for each activity, the materials and sup-
plies needed to complete the activity, and step-by-step instructions for completing each activity, additional drawing plans that illustrate construction details, and the evalu-
ation criteria that will be used to evaluate the grading of the projects. This activity book should be available when the instructor demonstrates each competency to be learned.

Environment People work more effectively and learn more efficiently if they are able to work in a "friendly" environment. Conditions in the agriculture mechanical laboratory that restrict stu-
dents’ ability to see, breathe, and hear can substantially reduce their ability to concentrate. Ventilation must be adequate for the learning activity. Lighting must be adequate. Lighting must be a minimum of 75-100 foot candles above workbenches. Adequate heating and cooling must be available for students. Obstacles on the floor should be rearranged, moved, or returned to storage. Benches, tools, equipment, and floors should be color coded to maintain a safe learning environment. We cannot expect students to work at their best if we ourselves would find it difficult to concentrate on an activity.

Summary The key to effective teaching in agricultural mechanics is the development of a systematic instructional process for the laboratory. A felt need must be established in the student by the teacher. Objectives must be set forth. These objectives must be meaningful, useful, and facilitate the mastery of the competencies identified. Quality tools must be identified that facilitate the instruction of these competencies; teachers must become involved in inversive activities; the facility must be arranged efficiently and safety should be stored in an orderly fashion and as close as possible to the appropriate work area; the agricultural mechanics laboratory must be environmentally safe and friendly to work in; and lessons must be planned in advance.

Extra Mile

 Going the Extra Mile

By Michael L. Grimm
Mr. Grimm is an agriculture teacher at West Jefferson High School, Quinton, Alabama.

Which teacher in your school would be considered the most if he/she were to leave? Would it be the math teacher? How about the chemistry teacher? Maybe it’s the head football coach! I strongly suspect that in most cases it would be the agriculture teacher. I stopped computation years ago of how many times I have gone out of my way to help a student, colleague, community adult, or the school administration. Most of these second mile journeys cost me personal time, family time, stressed me out, and wore out my pickup truck — not to mention the toll it took on my personal bank account.

Agriculture teachers have always been a unique group of professionals who go beyond the call of duty in serving their school, community, and professional organizations. Many teachers work extremely hard to get the job done and many times without proper recognition. Recently, while serving a term on the Jefferson County School District’s countywide inter-volunteer committee, the idea of developing criteria for a Special Teacher Award was proposed to us by the new school superintendent. The new superintendent brought to the system several worthwhile ideas and programs, all of which have been accepted. Therefore, the “Superintendent’s Award of Excellence” was born and was to be annually given to a deserv-
ing teacher at each school in the district who goes beyond the call of duty. A committee was formed consisting of one school principal and four classroom teachers representing both academic and vocational fields. You guessed it, I volunteered not only to serve, but to chair the committee which developed the criteria for the

Second Mile Teacher Award. After a series of meetings we established the following criteria:

The Second Mile Teacher is the teacher whose performance in the classroom exemplifies mastery of subject matter, effective teaching methods, and communication of knowledge to students, and who also...

- maintains a positive attitude toward our profession, our community, our school, our student body, and our faculty;
- appreciates and values learning and rein

forces effort in all areas of school work;
- exhibits school spirit and enthusiasm;
- sponsors extracurricular activities;
- maintains proper attendance and participates in professional organizations;
- shows evidence of continued professional growth and access to ideas, imagination, and creativity;
- provides enrichment for students such as outside reading, speakers, performances, travel, and work-study opportunities; provides an attractive learning environment (bulletin boards, paintings, plants, and personal touch to make the classroom and school inviting);
- is available to work with students before and after school and during unscheduled time;
- volunteers for those thankless tasks around the school;
- and ...

WOULD BE MOST MISSED IF HE/SHE WERE TO LEAVE OUR SCHOOL!!!

The names of the three teachers receiving the most votes from the school faculty are then considered by the school’s nominating commit-
tee of five. The committee’s five is composed of the school principal, a classroom teacher selected by the faculty, the president of the school PTA/O, and the school secretary, and president of the Student Government Association.

The recipients of this honor are invited to a dinner banquet sponsored by a local business interested in education. Those honored receive a nice plaque that reads “Jefferson County School District congratulates our Second Mile Teacher (with thanks) for superior profession-
als and for unmeasured service beyond the required call of duty of a classroom teacher.”

During the 1990-91 school year (I’m proud to say that I was selected by my school to receive this award) all the honors that were bestowed upon me is the one that I treasure the most. I think it might be because I worked harder and longer and had a small part in helping make the award become a reality in a school system that until 1989 really didn’t recog-
ize second mile.

This program has been a tremendous success in my school district. It has boosted teacher morale, increased student motivation, and placed a positive spotlight. I encourage other school districts to implement a similar program to recognize "Second Mile Teachers."
Increasing Teaching Effectiveness by Encouraging Higher Order Thinking

By M. Sue Whittington
Dr. Whittington is an assistant professor of agricultural education at the University of Idaho, Boise.

Higher Order Thinking?

What is the world in "higher order thinking"? It would be an evasion of the question to respond, "It depends upon who you ask."

Higher order thinking is a term which currently has nearly as many definitions as users of the term. In this article though, "higher order thinking" is used to describe the thought processes at the upper levels of Bloom's Taxonomy (Bloom, 1956).

Bloom's Taxonomy

Bloom's Taxonomy was built on a theory of varying levels of complexity in which cognitive thought and associated behaviors could be classified into six hierarchical levels (knowledge, comprehension, application, analysis, synthesis, and evaluation). Bloom argued that accomplishing higher order thinking (application, analysis, synthesis, and evaluation) required some analysis or understanding of the new situation, and a knowledge of methods which could be readily utilized, and some facility in discerning the appropriate relations between previous experience and the new situation (Bloom, 1956).

In 1988, Gibson and Chandler utilized Bloom's Taxonomy when they set forth this goal for the students: "to challenge students to learn how to apply facts in new situations, to analyze and synthesize the information they take in, and to make judgements about what they have found." (p. 433).

Are We Reaching The Goal?

Based upon the work of Newcomb and Treff (1987), Pickford (1988), and Miller (1989), students entering a college of agriculture today could expect to be taught by professors using discipline delivered primarily at the comprehension, application, and analysis levels. They could expect very little, if any, in-class discourse at the synthesis and evaluation levels.

Students could expect to be tested using mid-term examinations and one final examination, all written predominantly at the knowledge, comprehension, application, and analysis levels, with occasional items written at the evaluation level. Spontaneously, students might take a class that requires assignments; the assignments would be written at the synthesis level. Previous research indicates that regardless of the subject matter, course level, or experience of the professor, this would be the scenario (Whittington, 1991). The scenario can and will change as professors work to incorporate higher order thinking into their in-class discourse, tests, quizzes, and assignments.

Activities To Reach Higher Cognitive Levels

Activity One - Model Building

Offer students this challenge: "You are a nationwide task force asked to examine secondary agricultural education as we know it and offer recommendations for improvement." As part of the challenge students will:

a) List all components of the secondary agricultural education program of which they can think.

b) Circle those which they hold as sacred (comprehension);

c) State why they believe those they circled are valuable components (comprehension);

and d) Add any components they believe are missing (comprehension).

Using the thoughts the students have written, encourage them to draw a pictorial model of the "new" secondary agricultural education program (synthesis).


Ask three or four volunteers to recreate their models on the board. Lead the students in a discussion of the merits of each model (analysis). Finally, the task force must vote for adoption of the best model of secondary agricultural education (evaluation).

Suggestion for using this activity:

As a cognitive technique at the end of a problem area, unit, or course.

Modifications of the activity:

Compare and contrast the current model of secondary agricultural education with their own models.

Disadvantages of using the activity:

The time spent (one entire course period).

Students may not be familiar with the concept of models, and therefore, may be apprehensive in drawing models.

Students will possess varying degrees of familiarity with the components of secondary agricultural education.

Additional Activities

Activity Two - Trend Analysis

Choose a topic to analyze. Using articles, speeches, or written form from a selected professional magazine, assign students an article at two to five year intervals. An accompanying handout requires students to write pre-selected information including author, date, major theme of the article, and key words describing the chosen topic. In the second class, the charts are summarized on the blackboard as the students chronologically report their findings. With all the data on the board, lead students in a discussion of likenesses, differences, and recurring themes. Ultimately, lead students in thinking and writing about speculation for the future based on previous trends.

Note: Try using The Agricultural Education Magazine to study trends in SAES.

Activity Three - The Great Debate

As a summary to a unit of instruction, develop a cast of characters for reviewing various sides of an issue. Write each character on index cards that the students will draw at random one week prior to the summary of the unit. The students will prepare to become a character by writing a one-paragraph narrative describing the fictional character.

Begin class by asking students to introduce "themselves" and state why they are attending the debate. Serve as the moderator by asking leading questions and encouraging discussion, but allow the debate to flow.

Ample time should be planned at the end of class to lead students in drawing conclusions based upon the debate. Challenge students to write out of class) their reactions, conclusions, and an approach they would use when faced with this situation (the chosen topic).

Note: Use this activity to stage a debate on requiring FFA membership as part of secondary agricultural education.

Activity Four - Advisory Council

Develop a list of current issues in the profession. Write the current issues on index cards to be drawn at random during class. Divide the class into groups of four to five students. Challenge them to the advisory council for the local secondary agricultural education program. The advisory council will discuss each topic, then choose the one it considers to be "The Hot Topic" on the advisory council agendas for today. Each advisory council must write and present to the class:

a) and b) both sides of the issue;

c) a possible resolution;

d) the change agents in implementing the resolution; and

methodology for implementation of the resolution.

Note: This activity works well as a capstone activity in an introductory course.

Activity Five - Character Analysis

Choose a short video tape involving several characters. Develop an accompanying handout designed to allow the students to trace the characters. During class, the students should thoughtfully engage in observing and writing about the characters. Lead the students in a discussion of the leadership traits of the characters based upon the theories learned previously. Draw

Students analyze secondary agricultural education and choose valued components.
Increasing Teaching...

upon the theories learned previously. Draw conclusions and formulate speculations regarding each character. Ask students, "For whom would you vote for President? Why? Which character is most like you? Why?"

Note: This activity can be used in a small group setting for a leadership development class.

Conclusion

Now is the time to change the college of agriculture classroom scenario. Students entering a college of agriculture today should expect to be taught by professors who use activities delivered across the cognitive levels, including the synthesis and evaluation levels.

While the activities presented in this article are aimed at university level teaching, it is also important to apply principles of teaching higher order thinking at the secondary level. Activities presented can be revised to fit secondary agriculture programs.

Encouraging students to engage in higher order thinking is the challenge, but the challenge will not be met by chance. Careful planning and purposeful implementation of student-centered activities designed to encourage higher order thinking are only the beginning of creating classrooms rich in application, analysis, synthesis, and evaluation — thought processes necessary to equip students for living.

References


Effective Teaching...

States. For more information about attending or hosting a workshop contact Linda Whetn, Agronomy and Range Science Department, University of California, Davis CA 95616 (1961) 752-3040.

References


Improving Your Teaching: Questioning Techniques

Questioning is one of the most often used teaching techniques, according to Kim and Kellough (1987). According to Callahan and Clarke (1988), the use of questions is one of the most important of all teaching techniques. We use questioning during a class to stimulate thinking, assess student progress, check on teacher clarity, motivate students to pay attention, maintain classroom control, provide repetition, emphasize key points, and many more things.

If we try to structure our lessons using problem solving as a teaching method, as described by Crunkilton and Krebs (1982) and by Newcomb, McCracken, and Warmbrod (1986), then questions are central. Not only is much of the instruction organized by questions, we even state the problems to be solved as questions.

An Example:

Teacher goal: To relate slope to soil erosion and then to the use of terracing as an erosion control measure.

Question: What causes the terraced slope erosion? (WAIT)

Recall Question: Martin. (WAIT)

Question: I guess water does. (WAIT)

Probing Question: How does water cause soil erosion? (WAIT)

Question: Driving at Austin. (WAIT)

Analysis Question: Does water dissolve some minerals? But what action of water causes the soil to move away? (Looking at Austin — WAIT)

Analysis Question: That is partly right. It does dissolve some minerals. But what action of water causes the soil to move away? (Looking at Austin — WAIT)

Analysis Question: (WAIT)

Analysis Question: Letitia. (WAIT)

Comprehension Question: As the water moves, it picks up soil particles and carries them along. (WAIT)

Comprehension Question: That is right. Now, what does the slope of the field have to do with that? (WAIT)

Analysis Question: John. (WAIT)

Analysis Question: The steeper the slope, the faster the water runs off and that makes the erosion worse. (WAIT)

Analysis Question: I don't know what we can do to change the slope of a hill without flattening the whole thing out with bulldozers? (WAIT)

Analysis Question: Dale. (WAIT)

ETC...
Hunter Education: A Natural Complement to Agricultural Education

By Jamie E. Coren

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Agricultural educators are in a unique position to take advantage of a beneficial program that is offered for volunteer instructional participation in 49 of the 50 states of the United States. The program leads to enrichment and safety in the lives of hundreds of thousands of students annually. It will put agricultural educators in touch with younger students in the community. This program will allow enrollment for future agricultural education programs, while creating a rapport with parents and the community at large. This effort can become one of the most effective public relations activities available, as it is now mandatory in many states. Utilizing this program will allow agricultural educators to gain the use of one of the most respected resource persons in the community. Among the benefits is that this program can readily be incorporated into most existing natural resource curricula; the philosophy of this program is consistent with that of agricultural education. Additionally, most administrators are eager for their teachers to volunteer and utilize school facilities for this type of public service.

Description of the Program

The program that is the topic of this article is the Hunter Education Program. Hunter education is a comprehensive instructional program with the ultimate goal of giving hunters the responsibility for the sport of hunting. The major emphasis of this program is to prevent accidents and thereby secure the future of the sport, by making it safe. In order to accomplish this, students must be exposed to a diverse array of topics, including information on how to be responsible stewards of natural resources.

Importance of Natural Resources Instruction

The Hunter Education Program is based on natural resources. Indeed, the program materials are researched and written by various state Departments of Natural Resources. These materials should be of use to all agricultural education programs that incorporate natural resources instruction into their curricula.

Natural resources instruction has been a part of agricultural education for years and is currently expanding. Andrews, Weber, Whiton, and Williams (1991) recommended that environmental conservation education be included in educational systems. Additionally, their research indicated that conservation of natural resources is important, and that more education is needed in this area. The benefits of natural resource and environmental education are numerous for students and schools.

Specifically, Schwartz (1987) reported that students developed a more positive academic attitude after experiencing environmental education instructional activities. A national survey of fifth and sixth grade students (Lewellyn and Westveit, 1985) revealed that these students, who obviously have not had the benefit of natural resources instruction through agricultural education, demonstrated limited knowledge about wildlife, and that wildlife oriented materials should be infused into established school curricula.

Importance of Hunter Education

A legion of neophyte hunters takes to the field annually to enjoy the pleasing sights and sounds of our great American outdoors. These new hunters are eager to enjoy the excitement of hunting wild game with the same anticipation as generations of Americans in the past. However, hunters are beginning to realize that when one accepts the privilege of hunting, there is also an important responsibility which one must accept. This is the responsibility of being a safe, responsible, and ethical hunter.

The new Hunter Education Guide for the State of Georgia states that hunting accidents are usually the result of a lack of knowledge of the principles of safe handling of firearms and hunting behavior, or the failure of hunters to practice these principles. Hunter Education Programs are designed to teach these principles to inexperienced hunters, regardless of age; it is an excellent refresh course for all who enjoy hunting or handling firearms (Georgia Hunter Safety Instructor’s Guide, 1991).

Forty-four of the fifty states have legislature requiring hunters to have passed a hunter education course. The remaining six states; Alabama, Alaska, Indiana, Massachusetts, Minnesota, and South Carolina, do have voluntary programs for hunters (1989 Hunter Education Profile, 1990).

The Georgia General Assembly legislation passed in 1977 is an example of such a mandate. The act put into effect mandatory hunter safety training for all hunters born on or after January 1, 1961. This law dictated that all hunters must complete an approved course of instruction and be certified before they can legally purchase a hunting license. The law further dictates that while children under 12 years of age are not required to have completed the course, hunters aged 12 to 16 must have a hunter safety certification card on their person while hunting, and they must have hunter safety certification to receive their honorary big game tags (1991-92 Hunting Seasons and Regulations).

Availability of Hunter Education Programs

Hunter Education began formally in 1946. Kentucky, with its statewide youth camp program, was the first state to institute a formal firearms education course. Hunter education has expanded and progressed steadily during the past 50 years. Every state now has an agency responsible for instructing safe hunting behavior and important conservation practices. These agencies are working toward a nationally standardized and improved Hunter Education Program.

Student construct posters to apply material learned in Hunter Education session.

The 50 states, educators teach the hunter education program. All states include wildlife management and hunter responsibility to natural resources in their hunter education programs. Additionally, 43 of the programs teach wildlife identification, which may also benefit natural resources instruction (1989 Hunter Education Profile, 1990).

Student satisfaction with Hunter Education

A recent report (Jackson, 1990) indicated that the Hunter Education Program in the State of Georgia is quite effective. Among the responses gathered were those concerning natural resources; the majority of the respondents indicated that they hunt for appreciation of nature, and 78.1% of students said that they were eager to enroll in Hunter Education and were motivated to study and learn about wildlife, safety, and hunting skills. The participants rated these items on a scale of 1 to 5, pertaining to effectiveness of the Hunter Education Program:

Wildlife identification - 3.21
Knowledge of the principles of wildlife - 3.28
Nature appreciation - 4.17
Outdoor activity - 3.85

In the area of natural resources instruction, it was shown that the program augmented the students' own inclinations toward wildlife and nature appreciation. The student's positive motivation toward hunter education may benefit natural resources instruction, thus allowing teachers to incorporate parts of this instruction, as applicable.

Sponsoring (1991) profiled a set of Northwest Oklahoma deer hunters. His findings indicated that the vast majority of deer hunters were closely aligned with the principles of hunter education programs. Corporate rest examined, hunter education was the most positively accepted area. This was indicated by data such as:

90.4% of Northwest Kansas hunters felt that hunter education helped...
Agrimarketing In the 1990s: The Sky's the Limit

Satellite technology now has a daily influence on our lives. News is transmitted into our homes almost instantaneously from far off reaches of the earth by satellites. In recent years agriculture has benefited from these same technological advances. Today, more than 80,000 farms, ranches, businesses and agricultural classrooms nationwide receive timely visual information via satellite systems dedicated to agriculture.

Information related to agricultural markets, USDA reports, weather, and other time-sensitive news is broadcast throughout the continental U.S. and parts of Canada and Mexico. The majority of these agricultural satellite systems consist of a three-foot dish, pointed toward the Southern skies. This dish is placed outdoors, and a coaxial wire up to 75 feet in length connects to a desktop receiving unit and a monitor. Most monitors measure 10 to 14 inches in diameter, with color systems now readily available.

Advantages of Satellite Information
Electronic satellite information systems can serve as a valuable informational and educational tool. The cost is relatively low, since all equipment and cost of placing is leased. A one time initiation fee of approximately $200 is charged, in addition to a monthly rental cost ranging from $30 to $50. There are no telephone costs or special equipment needs. Information is current, with 70 pages or more of visual text available 24 hours a day. The visual nature of the system does not contribute to an unwanted accumulation of dated or unwanted information. A printer can be added to the system if hard copies of specific data are needed.

Agriculturally related information is updated on a daily and sometimes a minute-by-minute basis. Marketing information is a valuable asset because it keeps farmers and others informed of the current market situation and can keep them up-to-date on market trends. Some markets demand are featured in a text and graphic format. Technical information pertaining to agricultural commodity charts is broadcast during trading days. Local or regional cash market prices are updated once per day for most agricultural crops and livestock.

Implications for Teaching
Educational programming is now being conducted using the satellite technology that reaches a greater number of students. Additional DNR Conservation Rangers are free to handle other activities not suited for volunteers.

Students interested in volunteer Hunter Education Instruction should contact the local Conservation Ranger. The Ranger will then notify the district office and schedule the volunteer for the next instructor training session.

Instructor training sessions in Georgia are led by a DNR Ranger, with accomplished volunteers instructing. The volunteers address areas of instruction in which they excel. The instructor's course content is split between teaching and technical material.

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ever-changing commodity quotations provide an opportunity to incorporate competition that can be used to enhance student learning.

The Colorado State University course is called "The Credit Card of the Environmental Marketing Challenge." Students are challenged to be active learners and participate in the anticipatory nature of future careers. Understanding the use of futures and options to manage price risk in today's agriculture is a necessary tool needed by many producers and agribusinesses.

The Future for Agricultural Satellite Systems

Today the future looks bright for continued technological developments that can benefit agricultural education. Advancements related to aerial photography and two-way interactive satellite communication systems are currently being discussed for future use. A高中生 is positioned to be a major recipient of state-of-the-art communication systems. The challenge lies with educators that can develop the technologies to enhance student learning. For the 1990s, instructors teaching agrichemistry will find that perhaps the sky is not the limit.

References

Student Learning Styles . . . (continued from page 6)


Improving Your Teaching . . . (continued from page 17)

asks a series of related questions or restates the same question over and over without getting ting (sometimes without allowing) an answer.

3. Use recall questions first to see if the students have the knowledge. Then proceed to comprehension and analysis questions. Follow those up with evaluation questions.

Using Probing

Effective use of probing is one of the most important questioning skills. If the student does not provide a complete answer, he or she may know a partial answer. In some cases, even though the question is perfectly clear to the teacher, it might need to be restated or broken down into smaller pieces. The teacher should not accept "I don't know" as the final response.

Probing is the use of further questions to force the student to put together his or her partial knowledge into a more complete answer. Probing often involves the use of follow-up or leading questions to help the student answer the initial question to provide a more complete answer.

Probing means going deeper; it means digging. It can sometimes be painful to both the student and the teacher. It requires patience on the part of the teacher. In any case, it means not answering your own questions until you have tried to make the student think through the answer. Even a simple recall question may lead to important new learning on the part of the student if probing is used effectively.

Shifting Interactions

Another important questioning technique is called shifting interaction. This involves rephrasing the class discussion from one student to another. If a student's response is incomplete or incorrect, the teacher should try probing that student first. If that is not productive, responsibility for the question should be shifted to another student. Positive reinforcement should be provided to the first student, and the same question should be redirected to a second or even third student. Sometimes a student will respond to a teacher's question with another question. The teacher then should simply redirect the student's question to another student. If the student asks for an opinion, the teacher may even redirect it back to the same student.

Conclusion

Questioning is a means of getting feedback to evaluate student progress and is an important way to increase student learning. Just as importantly, it is a way to force students to think during class. Too often we treat our students like sponges — devices to soak up content — without expecting them to think.

Effective use of questioning is a critical asset in every good teacher's toolbox. But just as a good mechanic selects the right tool for the job and then uses it correctly, a good teacher questions students at right levels and practices good questioning techniques.

References


Teacher Behaviors . . . (continued from page 3)

successes, failures, and methods on a frequent and regular basis. This reflection must be guided by knowledge about teacher behaviors and methods that promote learning. And we must be able to accurately recognize the levels at which we display these behaviors and use these methods. We must continue to be students of teaching to be effective teachers.

References


Funneling together some of the major teacher behaviors that lead to effective teaching. (Courtesy of Vernon Luft, University of Nevada, Reno.)