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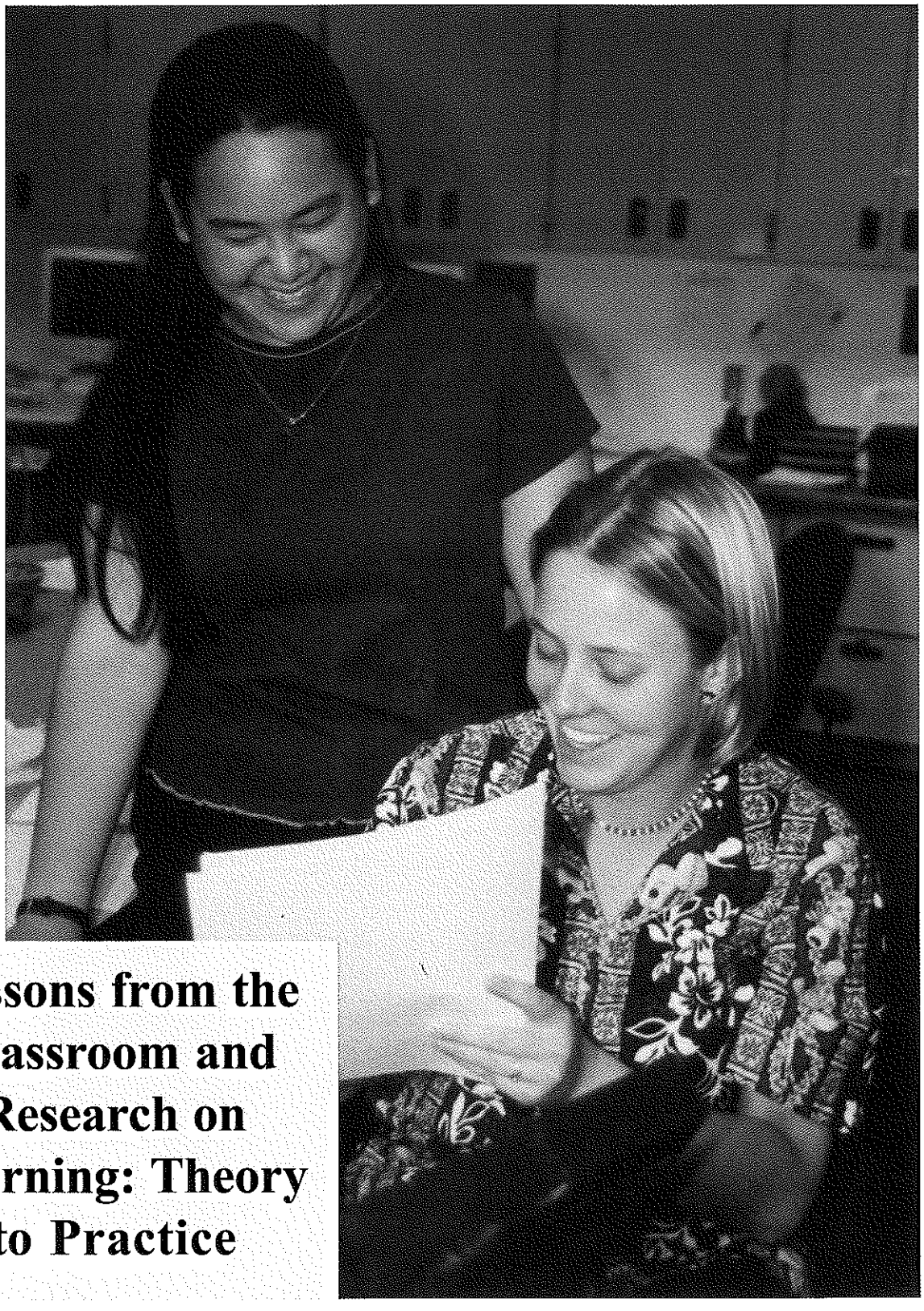


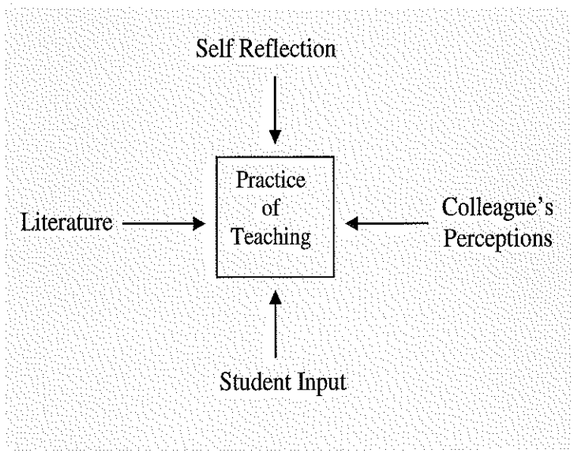
Lessons from the Classroom and Research on Learning: Theory to Practice

Teachers Who Think About Their Practice

By Robert A. Martin, Editor

The best educational researcher, just like the best career counselor, could very well be the classroom teacher of agriculture. What characterizes the teacher as a model for research? Why would a teacher want to be an investigator?

Stephen Brookfield (1995) reminds us that "when teachers are asked about learning more about teaching, they often say that they haven't learned much in their work and that things stay about the same year to year. However, when they reply to specific questions probing how they have changed in the last twelve months, many are surprised at how much has happened to them" (p. 75).



Teachers who think about their practice do more than merely select their technical content and deliver it in familiar ways. Teachers who think about their practice are teachers who follow a process of reflection. As identified by Brookfield (1995), "thinking teachers" are teachers who conduct self-reflection activities, listen and gather perceptions of professional colleagues, gather student input and review the literature for ideas and approaches to improve their practice. It is, in a sense, a personal investigation into the practice of teaching.

Teachers who think about their practice are models for their students. Students, regardless what they may say, want to please their teachers. If teachers act in a manner that suggests they are trying to improve their practice of teaching, students will know and will recognize the effort by their input and their actions.

Teaching is often characterized as being a lonely profession. Whether or not this is true is more dependent on the teacher than on the circumstances in which the teacher operates. Investigating our practice means gathering input deliberately and continually. Reflection is not a lonely act. It means digging for input, discussing the findings and thinking about what we do or plan to do.

If we are to use the classroom, laboratory or other site as a research center for and about learning, we must be willing to start with an investigation of our teaching practice. For that to happen we need to focus on the practices we use, gather input from students and colleagues and review information about the practice of teaching and reflect on our practices. In doing these steps we will provide a framework for students to follow in their own investigations and learning.

This issue of The Magazine has some very interesting articles. Thanks goes to Susie Whittington for soliciting, collecting and organizing these articles for the theme focused on using the classroom as a way to learn more about learning. Few issues of The Magazine have so sharply contrasted the issues in this high stakes business we call "Agricultural Education." What is the balance between experiential learning and testing as we seek to learn more about learning in the classroom, laboratory or related sites? Please read this issue of The Magazine to learn more about practices that impact learning in agricultural education.

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Brookfield, S. (1995) Becoming a critically reflective teacher. San Francisco: Jossey Bass.

Robert A. Martin is Editor of The Agricultural Education Magazine. He serves as Professor and Department Head of Agricultural Education and Studies at Iowa State University.

Theme: Lessons from the Classroom and Research on Learning: Theory to Practice

Authors writing for the November-December issue of The Agricultural Education Magazine discuss how research has affected the classroom and how to take learning theories into practice. (Photo courtesy of Jasper S. Lee, Demorest, Georgia.)

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Editor
Dr. Robert A. Martin, Professor and Head Department of Agricultural Education and Studies, Iowa State University, 201 Curtiss Hall, Ames, IA 50011, Phone (515) 294-5904, FAX: (515) 294-0530.
E-mail: drmartin@iastate.edu
Design and Layout: Stacie M. Turnbull

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What Could I Share About Teaching and Learning?

By M. Susie Whittington

From 1989 to 2000, I had the pleasure of observing teaching in nearly 70 college classrooms for well over 600 hours. During that time, as you can imagine, I witnessed teaching that ranged from barely competent to masterful.

I always enjoyed the opportunity to visit with the professors about their backgrounds and previous teaching experiences. Of course, their backgrounds were as varied as their level of mastery. As all of you know, most college professors have had no formal preparation in teaching, thus, as Dr. Lowell Hedges would contend, "they teach the way they were taught". However, among the "great ones" there was a common theme: they each had one significant influence in their lives for whom teaching was a passion.

Although my observations of the professors and my conversations with them does not constitute a scientific study, to me the finding is still significant; in college classrooms where teaching was superior, the professor was influenced by at least one masterful teacher.

What else did I learn? I learned that in each classroom where I observed, no matter the level of teaching mastery, the professor wanted to learn more about teaching and wanted to improve his/her classroom effectiveness. I easily learned, through the questions they asked me, the follow-up phone calls that came to me, and the requests I received to review syllabi or critique a new technique, that the professors were hungry for more.

What could I share with them about what is "known" in teaching and learning?

In this issue of The Agricultural Education Magazine, we explore "lessons from the classroom on teaching and learning". You may want to begin reading this issue by first reading Jamie Cano's overview of "what is known about effective teaching" where he examines the work of notable researchers in education. I suggest that your follow-on reading include the articles by Buriak and Yendol Silva who chose to position "teachers as researchers" in their own classrooms. Buriak uses his own laboratory as his quantitative and qualitative investigation site and implements changes accordingly. Likewise, Diane Yendol Silva presents the "pedagogical content knowledge (pck)" concept and walks readers through the inquiry process that teachers use to improve their classrooms.

Recently, we have all heard jargon related to achievement testing, personality typing and fostering learning communities. You will be interested in reading the insights provided by Jasper Lee, Tracy Kitchel, and Anita Woolfolk Hoy and Neil Knobloch on these current education subjects.

We know that students grasp concepts more readily when they have a framework to which they can attach the content. But, Anna Ball and Shannon Washburn, and Rick Rudd and John Ricketts wrote articles that patiently lead us through using "Bloom's Taxonomy" and the "Elements of Reasoning" to frame agriculture subject matter (with concrete examples) around a thought process that students can use in our classrooms.

And finally, if you are like me, solid applications are a must. Billye Foster and Jack Elliot share with us a "final presentation" required by all student teachers in their department. Aren't we all interested in ideas that leave our students with more confidence, and a sense of accomplishment?

What could I share about what is "known" in teaching and learning? From the overview, to the research, to the practical application, this is an issue of The Agricultural Education Magazine that begins to answer the question.

M. Susie Whittington served as the Theme Editor for the November-December issue of The Agricultural Education Magazine. Whittington is an Associate Professor in Agricultural Education at The Ohio State University.

Lessons from the Classroom and Research on Learning: Theory to Practice

How to Successfully Publish in The Agricultural Education Magazine

The Agricultural Education Magazine has provided the profession a wide variety of ideas, practices and procedures that have proven successful for thousands of teachers, students and other professionals interested in Agricultural Education. The authors who have submitted their work for publication in this journal have consistently provided much food for thought and many practices that work well in the teaching-learning process. Potential authors often ask questions regarding the parameters for publication. The following ten steps may prove useful to you as you prepare your article for The Magazine. If you have additional questions or concerns, please contact the Editor. Please consider writing an article for The Magazine. Your profession needs to "hear" about your ideas, successes, concerns, and approaches to teaching and learning that work for you.

* The best articles for The Agricultural Education Magazine are the ones that have a clear point and share practices that can be used in the "real world" of teaching agriculture. The Magazine is a "hands-on" practical approach journal. Articles should share specific steps one can take to make teaching and learning in and about agriculture more enjoyable, efficient and effective. Philosophical or theoretical articles are appropriate if they have a specific message and can be useful to the practitioner in the field.

* Refer to the latest issue of The Magazine to determine the dimensions of similar articles.

* Final copy should be two pages as shown in the journal. A four page double spaced manuscript is approximately the proper article length for submission.

* Articles should be accompanied by a recent headshot photo of the author(s).

* If the author(s) has photos and drawings etc. appropriate for the "theme issue" for which he/she is submitting an article, please make sure the photos are of high quality and they tell the story. Only hardcopy (not digital) photos are acceptable to the printing company.

* Manuscripts should be sent to the Theme Editors if at all possible, however articles may be sent to The Editor if that is the preference of the author(s). Theme articles get first priority in article selection for publication. General articles will be used when space is available.

* Manuscripts are due to the Editor of The Magazine at least 60 days prior to publication. Follow the published timeline carefully. Work closely with the Theme Editor to have a timely submission. The Editor makes the final decision to publish any article.

* All manuscripts received by The Editor are acknowledged. Please make sure your address, phone and e-mail addresses are available and clearly identifiable.

* Each author is asked to sign a "release" form. This release form gives permission to reprint your article once it is published in The Magazine.

* If your article is published, you will receive a free copy of the journal along with a letter of congratulations. Additional copies of The Magazine may be available from the Business Manager.

Editor: Robert Martin
(515-294-5904)
drmartin@iastate.edu

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Dr. Brenda Seevers
bseevers@nmsu.edu
Theme: *Innovative Curriculum Ideas & Practices in Agricultural Education*

➢ March – April 2002
Dr. Barbara Kirby
barbara_kirby@NCSU.edu
Theme: *The Role of Science in the Agricultural Education Curriculum*

➢ May – June 2002
Dr. Connie Baggett
bbc@psu.edu
Theme: *The Role of Career Education in the Agricultural Education Curriculum*

➢ July – August 2002
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lbell1@unl.edu
Theme: *The Role of Community Resources in the Agricultural Education Curriculum*

➢ September – October 2002
Dr. Greg Miller
gsmiller@iastate.edu
Theme: *The Role of Research in the Agricultural Education Curriculum*

➢ November-December 2001
Dr. Tracy Hoover
tsh@psu.edu
Theme: *The Latest Trends in Teaching Agricultural Education*

What is Known About Effective Teaching?

By Jamie Cano

In the United States, research on teaching has produced vast amounts of information. The majority of this research has been conducted using causative factors, such as classroom activities, curriculum initiatives, or methods of instruction. Since the 1970s, teacher behaviors have been researched as they relate to learner achievement. What is still missing is research on how teacher behaviors affect and effect the curriculum, the school environment, and their learners. In spite of all the research efforts in education, agricultural education included, the most frequently asked question continues to be: What makes for effective teaching?

While there are many characteristics to describe effective teaching, there is no single definitive quality that can be attributed to the success of teaching. Current research studies reveal a strong association between specific instructional behaviors and learner performance. Further, there is a wealth of research manuscripts on specific teacher behaviors and gender/ethnic expectations. In all that has been written, researchers have attempted to identify specific managerial, instructional, and personal attributes of teachers to distinguish the *effective* teachers from the more *ineffective* teachers. McDonald (1977) stated that it was a combination of knowledge of subject matter (content), knowledge of teaching and learning theory, and the utilization of various teaching methods that produced effective teachers.

Also, in the 1970s, researchers like Dunkin and Biddle, Gage, Good, Brophy, and Evertson, attempted to build a scientific foundation for teaching by associating teacher behavior with learner achievement. What was learned in all these studies was that when teachers systematically structured their behaviors, learner achievement increased. It was concluded that because of greater teacher effectiveness and superior teaching quality, there was a corresponding resurgence in learner achievement.

Engaging all learners in learning is our primary mission as educators. All stakeholders - teachers, colleagues, parents, and the larger community - are needed to reach this goal.

Brophy and Good teamed together and reviewed a large number of research studies involving teacher behaviors and learner achievement. The conclusion reached by Brophy and Good (1974) was that the most effective strategy for optimal learning was the conceptual level, a level at which the teacher and the learner were matched cognitively. Other researchers found significantly greater interpersonal relationships between teachers and learners who were matched in their cognitive style, versus those who were mismatched. Three sources of increased learner achievement were: a shared interest with the teacher, shared personality characteristics with the teacher, and a similarity in communication modes with the teacher.

Research in sociology, psychology, anthropology, and philosophy, disciplines which are the foundation for education, supported the premise that teaching was a highly complex, content-specific, interactive activity in which differences across classrooms, schools, and communities were critically important. Other studies in teaching investigated cooperative learning, social learning theory, and information processing strategies as a link between teaching methods and learner outcomes. The results were non-consistent.

While the research in teacher effectiveness is on-going, and by no means complete, there are significant factors which are known to affect learner achievement as related to teacher effectiveness. Educational research has produced a number of teacher behaviors that can be replicated with success in classrooms of any subject matter. The quality and frequency of learner-teacher interactions can directly affect the learner's ability to learn. Research studies have documented the effects of the teacher's interaction with learners and found the degree and frequency of praise, use of classroom time, and the amount of attention given to groups or individuals to have significant positive correlations to a learner's ability to learn.

The most noteworthy study of the 1970s was the work by Rosenshine and Furst. Rosenshine and Furst (1971) examined the relationship between teacher behavior and learner achievement and found eleven variables that significantly impacted the teaching learning process. The five most significant variables were: clarity, variability, enthusiasm, task oriented and business-like behaviors, and learner opportunity to learn criterion material. These variables have been one of the "must know" of agricultural education methods courses. Over time, the Rosenshine and Furst variables have been studied by other researchers, with the results found to further support the finding by Rosenshine and Furst.

Other notable researchers like Glasser (1986), stated that the amount of attention the teacher gave to helping the learner make plans, to execute the plans, to revise the plans, and to continually push the learner for success were critical for the achievement of the learner. Glasser further emphasized that the teacher's interaction with the learners was much different and stronger than personal involvement with the learners. Furthermore, Reinhartz and Reinhartz (1988) concluded that there was a strong relationship between what a teacher expected from a learner, and the resulting learner's achievement. Reinhartz and Reinhartz identified the following teacher behaviors as having a significant impact in learning: length of time after asking questions, proximity of teacher to learners, degree of benefit of doubt on examinations, degree of eye contact, level of questioning, efforts to assist the learners in their responses, and the use of class time.

Most recently, Danielson's (1996) framework for teaching, groups teachers' responsibilities into four major areas, which are clearly defined and further divided into components. The framework provides a "road map" to guide teachers through classroom experiences, a structure to help experienced teachers become more effective, and a means to focus improvement efforts. The framework is based on an analysis of important tasks or behaviors required of teachers, reviews of research, and extensive field work that included pilot testing the criteria. The Danielson "model" is what has become known as PRAXIS III. Although PRAXIS III is geared towards teacher licensure, the four major areas, with their accompanying components, are what some are calling "the closest that education has come" to identifying "effective teaching."

Briefly, the four major areas of the Danielson model are: Planning and Preparation, Classroom Environment, Components of Professional Practice, and Professional Responsibilities. The Planning and Preparation components are: demonstrating knowledge of content and pedagogy, demonstrating knowledge of learners, selecting instructional goals, demonstrating knowledge of resources, and assessing learner learning. The components for Classroom Environment include: creating an environment of respect and rapport, establishing a culture for learning, managing classroom procedures, managing learner behavior, and organizing physical space.

The components for Professional Practice include: communicating clearly and accurately, using questioning and discussion techniques, engaging learners in learning, providing feedback to learners, and demonstrating flexibility and responsiveness. Finally, the components for the Professional Responsibilities area are: reflecting on teaching, maintaining accurate records, communicating with families, contributing to the school and district, growing and developing professionally, and showing professionalism.

Engaging all learners in learning is our primary mission as educators. All stakeholders - teachers, colleagues, parents, and the larger community - are needed to reach this goal. It appears as if we know what effective teaching is and how to deliver it; the challenge is to fulfill our obligation as educators.

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Jamie Cano is an Associate Professor at The Ohio State University.

The Classroom as a Teaching Laboratory

By Phil Buriak

I have had the privilege of sharing ideas about teaching with many current, new, and prospective high school agriculture teachers. They have been prepared through their university teacher preparation programs and have gained knowledge in their subject domain through agriculture classes and personal experiences. They have the tools and experiences necessary to begin teaching.

Teaching and learning are dynamic processes. Teachers must continue to grow into their professions. University agricultural education departments and professional associations often provide "inservice activities" to improve teachers' knowledge in their subject domain; agricultural mechanics, aquaculture, biotechnology, etc. To my knowledge, little inservice is provided to improve teachers' understandings of the teaching/learning process. So, how do practicing high school agriculture teachers improve their classroom teaching beyond that of a beginner? Where do they learn to be more effective teachers?

High school agriculture teachers have formal training in teaching sufficient to begin as teachers. How and where do they learn to master their craft and become more effective teachers?

Teaching is a craft

To learn a craft, apprentices observe, work, and practice with a master craftsman, usually over some extended period of time. Now ask yourself; how many master teachers have I observed? How many master teachers have I had the opportunity to work with and to practice with for some extended period of time, particularly after I began to teach? After student teaching, I'm certain we have had almost no contact with practicing master teachers. How then can high school agriculture teachers continue professional development in the classroom?

Classroom as a laboratory

The classroom becomes a teaching laboratory. Problems are identified by the teacher and are specific to the particular class. The solutions identified focus on immediate application in the local setting. Findings are evaluated in terms of their local applicability, not their generalizability to other classrooms in other settings. "Is it valid for my classroom?" is the only concern. Exploration, explanation and effect size are the measure of quality. The purpose is to improve practice in my classroom (to improve teacher effectiveness), not to build theory.

Using the classroom as a teaching laboratory allows us to study practical/real problems. We plan and conduct "research" and are most likely to be affected by the findings. We can extend our knowledge about teaching and learning. We become more responsible for our personal professional growth and development as a teacher in our classroom.

Classroom research can have quantitative dimensions (objective, number based data), but, for the most part, is qualitative research (subjective, word based data), following qualitative methods and designs. Data are collected by the researcher; the teacher is a participant observer. The teacher/researcher attempts to understand that which is actually occurring in a particular situation under a particular set of conditions. The teaching is the treatment.

Where do we begin?

Teachers should look to their particular classrooms and begin to ask questions. What do I do that contributes to student learning? What aspects of the course are most difficult for the students to learn? Why are students having difficulties? What preconceptions do students bring to the class that either helps or hinders their ability to learn? How might I modify a presentation or an assignment or laboratory to improve student learning? Can I design more effective homework assignments? Are my visuals appropriate and effective?

Teachers need to critically observe and reflect on what is occurring in their classrooms, just as would be done by university researchers in their laboratories. Explore and try to explain the teaching/learning process. The outcome of classroom research is always student learning. Again, the teaching is the treatment. As the teacher and the researcher, we have the power to manipulate the treatment and study its effect on student learning. We are also the principle instrument for data collection.

Using Data

Classroom researchers have both qualitative and quantitative data available to them. Since it is their classroom, they have control. Examinations, quizzes, homework assignments and laboratory reports can all be designed and evaluated to answer specific questions about teaching effectiveness and learning. Qualitative data can be collected through careful and systematic observation. Another source of information/data are the students themselves. Through journals and/or e-mail reactions to specific questions, topics of interest, and simple process analysis, the classroom researcher can gain valuable insight into what students are learning, how they are learning, where the difficulties might be, and general perceptions of their teaching/learning experience.

The classroom researcher can then analyze the data. No need for inferential statistics: statistical inference (generalizability) is of little value or concern. Simple descriptive statistics, content analyses, and subjective descriptions of observations and student inputs provide the means to make decisions to improve the effectiveness of the treatment…the teaching.

The Example: Using the classroom as a clinical laboratory improved effectiveness of instruction (student achievement) in an introductory course in Technical Systems Management, an agricultural engineering technology course. Surface drain design is the capstone activity for the soil and water portion of this course. This design activity requires students to use knowledge and skills in horizontal land measurement, profile leveling, reading charts and graphs, designing, and calculating areas and volumes. Although no single task is overly complex, many tasks need to be correctly completed and correctly sequenced to complete the design problem.

Normally, the surface drain design problem is presented during two lectures. In each of the two lectures, a sample problem is reviewed. Lecture is followed by lab, where survey data are collected and students design a drain. Sixty to seventy percent of the students successfully complete the design. Why do thirty to forty percent of the students have difficulty with the surface drain design problem?

A problem was identified by observing laboratory reports and quizzes. A task analysis of the design activity was completed and laboratory reports and quizzes were compared to see if any one step was preventing students from successfully completing the design. No one step was identified as a confounding step. Students were then asked to communicate via e-mail, identifying difficulties they were having with the design. Again, no single step was contributing to the difficulty. Students understood the design when explained in lecture, but did not possess sufficient mastery to conduct the design on their own. Why not?

Two principles of learning came to mind. Students learn best when new knowledge is connected to what they already know; and, the rule of seven, i.e., students have difficulty learning more than seven bits of information per session. Remembering that the teaching is the treatment, a classroom experiment was designed…the treatment was modified.

Rather than deliver two lectures, each reviewing a surface drain design problem, the first lecture was changed to the design of a driveway. All students have previous knowledge of a driveway (not true regarding surface drains) and the steps in designing a driveway closely approximate those of a surface drain. The difference between the two designs is one of cross-section. The driveway has a rectangular cross-section with a constant top width. The surface drain may be triangular, trapezoidal, or parabolic in cross-section with the top width varying as a function of cut. Not only did the driveway example present information in a context students already knew, but, it reduced the number of steps in the design since cross-section was less variable.

The second lecture then built on the driveway design. The only new information was the introduction of the different cross-sections and the accompanying area and volume calculations. In addition, a "quick time" video of a waterway in operation was shown so students could better understand a surface drain conceptually.

The treatment was modified. Data were again collected. Students achieving mastery of the surface drain design increased from 60 – 70% to 80 – 90%. Teaching effectiveness improved. Students learned how to design surface drains and the teacher learned how to be more effective in the classroom.

Benefits of classroom research

When teachers design and conduct classroom research, questions about student learning come to the forefront. Teachers are forced to reflect on their teaching. By asking questions and collecting data, teachers may better understand the teaching/learning process and become better teachers.

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Phil Buriak is a Professor at the University of Illinois.

Recognizing the Complexity of Teaching: Teacher Inquiry as a Vehicle for Learning

By Diane Yendol Silva

The University of Florida

Studies of Teaching (Jackson, 1968; Lortie, 1975; Clandinin, 1986) describe teaching as complex work characterized by simultaneity, multidimensionality, and unpredictability. In classrooms, competing goals and multiple tasks are negotiated at a breakneck pace, trade-offs are continually made, unanticipated obstacles and opportunities arise. Each hour of every day teachers must juggle the need to create a secure supportive environment for learning with the press for academic achievement, the need to attend to individual students and the demands of the group, and the challenges of pursing multiple strands of work so that students at varying places in their learning move ahead and none are left behind (Darling-Hammond,1997, p.69).

As a leader in the field of teacher education, in this excerpt, Linda Darling-Hammond captures the complexity of teaching and leads teacher educators to the question, "How can we best prepare teachers for the challenges they will face teaching all children in 21st century schools?"

To answer this question, teacher educators begin by recognizing the intellectual activity that teaching in the 21st century requires. As a result, prospective teachers must be prepared for new challenges in order to become effective professional decision makers. Teacher instructional and curricular decision-making rests on the teacher's ability to simultaneously consider individual and collective student needs, the school and classroom context, the subject matter of the lesson, the instructional approach, and the teacher's professional beliefs. This complex process promotes the teacher's construction of *pedagogical content knowledge (PCK)* necessary to educate all children.

Building on Grossman (1990), Shulman (1986, 1987), and Magnusson, Krajcik, & Borko's (1999) work, PCK represents the teacher's ability to transform subject matter knowledge into pedagogy by constructing learning experiences that organize and represent the knowledge and processes of a content area in light of particular contexts and students.

The construction of PCK is an intellectually demanding and complex activity that is neglected by the current focus on high stakes testing, "teacher proof," and highly scripted curriculum. Teacher inquiry is a powerful vehicle for helping prospective teachers move beyond this scripted curriculum to develop PCK that leads to enhanced student learning. In fact, research suggests that teacher inquiry has the power to transform classrooms, schools, and the teaching profession as knowledge about teaching and learning are generated from and used by those closest to the children – classroom teachers, and principals.

What is Teacher Inquiry and how does it develop PCK?

The teacher inquiry movement engages teachers in developing PCK as they identify key problems to study, design a study, collect data, interpret data, and make changes in their classrooms. Teacher inquiry shares similarities with action research (Carr and Kemmis,1986). This inquiry process: (1) generates theories and knowledge grounded in the realities of educational practice, (2) encourages teachers to become collaborators in educational research focusing on their problems for investigation, and (3) views teachers as central to the research process since they are more likely to facilitate change based on the knowledge they create.

When teachers study their classrooms in order to develop the PCK that can improve instruction they begin by brainstorming questions. Teachers' questions emerge from their own classroom observations and felt difficulties. These questions often represent four general categories: (1) focus on pedagogy, (2) focus on a particular child/children in the classroom, (3) focus on one's own teaching beliefs, and (4) focus on the curriculum.

Once a teacher inquirer has defined a question of inquiry, the next step requires developing an inquiry plan for gathering the data. Since meaningful teacher inquiry should be a part of the teacher's daily work, developing a plan for data collection means identifying ways data can be naturally captured within the classroom. To capture "action" in the classroom, teachers observe and take fieldnotes, tape record or videotape, diagram the classroom, or have others (administrator, co-teacher researcher, paraprofessional, student teacher, instructional support teacher, curriculum specialist, or university researcher) take notes for them. As a method of tracking student performance in the classroom, many teachers collect student work and other classroom, school, or school district artifacts. Artifacts include documents that may be related to the research such as curriculum guides, parent newsletters, and correspondence to and from parents, principal, and specialists.

To capture the "talk" that occurs in the school and in the classroom, teacher researchers conduct interviews. Interviews can be informal, spontaneous, or more thoughtfully planned. Depending on the teacher's inquiry, interviewing children in the classroom as well as adults such as parents, administrators, other classroom teachers, and instructional support teachers can be a rich source of data.

To capture the "thinking" that occurs in the school and classroom, teacher researchers often keep their own journals reflecting on their own thought processes as well as ask students to journal about their thinking related to the project at hand. Additionally, more formal mechanisms can be employed (such as surveys and sociograms) to capture the action, talk, thinking and productivity that are a part of each and every school day. Data collection is not separate from teaching, but a part of what the teacher does each day in the classroom.

As teachers collect data, they simultaneously engage in data analysis. Hubbard and Power (1993) describe data analysis as "the process of bringing order, structure, and meaning to the data, to discover what is underneath the surface of the classroom" (p. 65). Analysis involves reading and rereading the data looking for categories or patterns to appear. This inductive process brings teachers closer to the happenings within their classroom and builds meaningful connections between their work and opportunities for enhancing their work with children.

Throughout the inquiry process, teachers also read relevant literature related to their work. In essence, the literature serves as another source of data that systematically offers insights into the question the teacher pursues. By utilizing the literature as a data source, a teacher's work becomes connected to the thinking of others in the field of education.

The final process of teacher inquiry is writing up the results of a particular inquiry and sharing the findings with others. Some school districts, school-university partnerships, and other educational communities have teacher inquiry conferences dedicated solely to providing a forum for teachers to share their work. Other forums include sharing inquiry work at faculty meetings or disseminating their work in journals.

Where does Inquiry Take 21st Century Teachers?

By participating in teacher inquiry, teachers construct the pedagogical content knowledge needed for real change to take place for students in their classrooms. The inquiry process pushes teachers beyond the short-sighted thinking of scripted and "teacher proof" curriculum by providing teachers with a tool for understanding the learning needs of all students. The ultimate goal of creating an inquiry stance is to prepare teachers for the complexity of teaching and learning in the 21st century. This stance provides the professional positioning where raising questions becomes a central feature of teacher work.

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Diane Yendol Silva is an Assistant Professor at the University of Florida.

Gaining High School Achievement in Agriscience

By Jasper S. Lee

High-stakes testing has emerged as a major molder of practice in schools today. Teachers want their students to make good scores on standardized achievement tests. Students typically want the best scores they can. Working together, teachers and students can participate in learning activities that promote higher scores.

A number of educational practices are used in agricultural education throughout the United States. These are typically and commonly accepted as "ways to teach" in agricultural education. Are these practices efficient? Do they lead to high student achievement?

The commonly accepted "ways to teach" include, among others, the three major program components: classroom and lab instruction, supervised experience, and FFA. Within each of these, specific techniques are used. Some of the techniques have been used for many years; others have emerged in the last few years. No research has been done to identify the most efficient "ways to teach" by looking at student test scores on a nationwide basis. The instruction has typically involved considerable psychomotor learning in labs, part-time jobs, and student project ownership. Efforts to help students internalize the related theory and principles, i.e., the background knowledge, have often been minimal. It is this background knowledge that standardized tests typically assess.

Teachers in schools where theAgri-Science Achievement test (AAT) was administered were asked to provide background information about themselves and their schools. This information has been used to identify selected attributes leading to high student test scores.

The AAT was developed to measure mastery of technical information in agriculture. Emphasis was on basic, science-based agriculture classes. The AAT has two forms: Basic and Advanced. The Basic Form is for administration after the first course in science-based agriculture. The Advanced Form is designed to be administered after the second course or later.

Each form has sixty test items, developed using state curriculum guides, blue prints, and other competencies/outcomes of agricultural education. A national panel of test item validators was used to help assure validity and reliability. Tests were field tested in a number of schools and then administered nationally.

The number of students enrolled in a high school is related to test scores. Students in high schools with enrollments of 1,000 or fewer students had, on the average, 37 percent higher test scores on the Basic Form of the AAT than those in high schools with over 1,000 students. Interpretation: *Students have higher test scores in schools with 1,000 or fewer students.*

The number of students in class sections appears not to be as important in test score achievement as has been thought. If an enrollment of 12 students is selected as the breakpoint between small and large classes, the difference in student scores is negligible on the Basic AAT. On the Advanced AAT, students in smaller classes scored 18 percent higher. Interpretation: *Class size is not as important with introductory or basic classes as it is with advanced classes, where students in smaller classes have higher test scores.*

Alternative, or block, scheduling has been implemented in high schools nationwide since the early 1990s. Advanced agriculture classes have long involved double-period scheduling, and this has provided benefits in student achievement. The findings of this research tend to support block scheduling over traditional scheduling. Students in schools that used block scheduling scored 10 percent higher on the Basic AAT. No information is reported for the advanced classes due to the small number of schools on traditional scheduling that used the Advanced AAT. Interpretation: *Students in classes on block scheduling have higher test scores in basic classes than those in classes with traditional scheduling.*

Teacher experience, education, and gender attributes are included in this article as related to student test score achievement. The reader should remember that emphasis on science-based agriculture emerged rapidly since the late 1980s. Teachers who entered teaching at or before that time were likely prepared in traditional ways without attention to methods of teaching science-based classes.

The national average number of years of teaching agriculture is slightly over 14 years. This was used as the breakpoint in teacher experience. There was no difference in student test scores on the Basic AAT in classes based on the number of years their teacher had been teaching. Student test scores on the Advanced AAT in classes taught by teachers with over 14 years of experience were 10.3 percent lower than those with 14 or fewer years of experience. Interpretation: *Students of teachers who are relatively new in teaching may have higher scores than the long-experienced teachers in science-based agriculture classes.*

The students of teachers with a baccalaureate degree as their highest level of education score almost equally with those who have a master's degree or higher. Of course, teachers with advanced degrees have been teaching longer and may lack specific preparation in how to teach science-based agriculture. Interpretation: *The educational level of the professionally-prepared teacher does not appear to be a major factor in student test score achievement.*

Increasingly, agriculture classes are being taught by female teachers. The number of female teachers has steadily increased since the mid-1970s, when agriculture teaching was dominated by males. On the Basic AAT, students of female teachers scored 5.4 percent higher than those of male teachers. With the Advanced AAT, students taught by male teachers scored 5.4 percent higher than those of female teachers. Interpretation: *Student achievement varies little by gender of the teacher though students of female teachers tend to have higher test scores in introductory classes and students of male teachers tend to have higher test scores in advanced classes.*

Teachers reported the primary instructional strategies used in the classes. The highest average score on the Basic AAT was in classes primarily taught by class presentations and discussion. Combinations of strategies were next and closely followed by laboratory-based instruction. Students with primarily computer-based instruction scored 27.2 percent below those taught with classroom presentations and discussion. On the Advanced AAT, students primarily taught with laboratory-based instruction achieved higher scores than those taught with other approaches. Interpretation: *Instructional strategies that focus on student mastery and helping students internalize and articulate information yield the best achievement on standardized tests.*

Textbook use is an important part of the learning process in some classes. They are not used in other classes. In terms of student test score achievement on the Basic AAT, students in classes using textbooks scored 12.1 percent above those in classes not using textbooks. The scores of students of female teachers using textbooks averaged 31.1 percent higher than those without textbooks. Interpretation: *The use of modern, science-focused agriscience textbooks results in markedly increased student test score achievement.*

Supervised experience (SE) is an important educational component in agricultural education. The findings were reported in terms of the percentage of students who have SE. The classes were divided into two groups: those with 50 percent or below of the students having SE and those with over 50 percent of the students having SE. On the Basic AAT, students in classes with 50 percent or below having SE scored 13.5 percent above those in classes with more than 50 percent of the students having SE. On the Advanced AAT, there was little difference in student test scores and emphasis on SE though the nod goes to students in classes where it appears that less time is devoted to SE. Of course, SE is closely related to achievement of FFA activities. These have benefits to students that go beyond gaining high achievement test scores. Interpretation: *Students in classes where there is greater emphasis to on-task learning content have higher achievement test scores.* (It is the author's personal observation that some teachers allocate class time to SE to the detriment of student content mastery. A balance is needed to assure that SE emphasis does not take away from emphasis on subject matter.)

Achievement tests have been widely used in American education to assess student mastery of information. These tests have become increasingly important in determining accountability of teachers and school systems. Relating test data to characteristics of the instructional environment should provide useful information for teachers to improve the scores of their students. The findings should also help teacher educators redirect the approaches used in preparing future teachers for their roles as teachers.

The research reported here appears to challenge some of the traditions in agricultural education, such as heavy supervised experience and student organization work. It also challenges the use of computer-based learning approaches. It appears the use of classroom time for supervised experience, student organizations, and computer-based approaches takes away from student achievement on standardized tests. More research relating student achievement to attributes of the educational environment is needed.

Overall, students will achieve higher test scores if taught using on-task approaches that push for mastery of the content. Student-focused instruction is important in gaining mastery. Providing students with appropriate learning tools and using these tools in a resource-rich instructional environment promotes higher achievement test scores. A part of the process involves teachers taking responsibility to keep current in the technical areas of agriculture as well as those professional areas that yield good educational results.

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Jasper S. Lee is a consulting Agricultural Educator in private practice as Lee and Associates, P.O. Box 280, Demorest, GA 30535. A more detailed summary of the study is available from the author.

Lessons from the Classroom and Research on Learning: Fostering Communities of Learners

By Anita Woolfolk Hoy and Neil Knobloch

Fostering Communities of Learners (FCL) is "a system of interacting activities that results in a self-consciously active and reflective learning environment" (Brown & Campione, 1994, p. 292). This instructional program, grounded in psychological learning theories, has implications for agricultural education at many levels.

Especially given our space limitation, it is tempting to reduce the complex processes and understandings of FCL into a simple set of steps or procedures. But the inventors, Brown and Campione, caution us that, in considering FCL, our emphasis should be "on functionality, philosophy, and principles, not on procedures" (p. 315). Thus we will not attempt to give a complete description of FCL, but rather give an overview of some key principles and possible applications in agricultural education.

At the heart of FCL is a three-part process: Students engage in independent and group research on one aspect of the class inquiry topic—for example, animal adaptation and survival. The goal is for the entire class to develop a deep understanding of the topic. Because the material is complex, class mastery requires that students become experts on different aspects of the larger topic and share their expertise. The sharing is motivated by a consequential task—a performance that matters. The task may be a traditional test or it may be a public performance, service project, or competition. Thus the center of FCL is *research,* in order to *share* information, in order to *perform* a consequential task (Brown & Campione, 1994).

This inquiry cycle may not seem that new, but what sets FCL apart, among other things, is having a variety of research-based ways of accomplishing each phase, and careful attention to teaching students how to benefit intellectually and socially from each step. *Research* can take many forms such as reading, studying, attending research seminars, guided writing, consulting with experts face-to-face or electronically, or peer and cross-age tutoring. In order to do research, students are taught and coached in powerful comprehension-monitoring and comprehension-extending strategies such as summarizing and predicting for younger students and for older students, forming analogies, giving causal explanations, providing evidence, and making sound arguments and predictions. Students are taught explicitly how to *share* information by asking for and giving help, majoring (developing special interest and expertise in an area), learning from each others' exhibitions, participating in jigsaw cooperative groups (Aronson, in press), and joining in whole class cross-talk sessions to check the progress of the research groups.

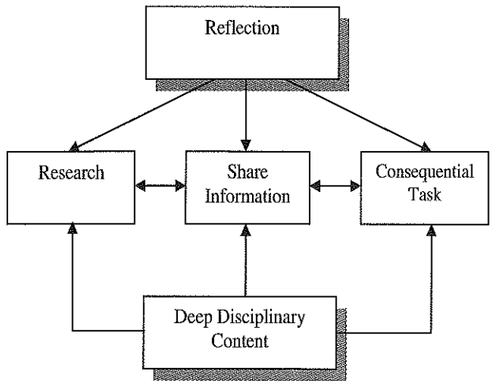

Figure 1. Fostering Communities of Learning Model.

Performing consequential tasks includes publishing, designing, creating solutions to real problems, as well as exhibitions, performances, tests, quizzes, and authentic assessments that can hardly be distinguished from ongoing teaching.

As noted in Figure 1, thoughtful reflection and deep disciplinary content surround and support the *research, share, perform* cycle. FCL teachers create a culture of thinking (Tishman, Perkins, & Jay, 1995) —self-conscious reflection about important and complex disciplinary units. As Brown and Campione (1994) point out, we "cannot expect students to invest intellectual curiosity and disciplined inquiry on trivia" (p. 306).

"A main ploy of an FCL classroom is to trap students into thinking deeply" (Brown & Campione, 1994, p. 302). Consequential tasks engage students to understand deep disciplinary content through applications of the knowledge and reflection of the research-share-perform process. Consequential tasks also provide the foundation for a variety of assessments. Assessments should be guided, transparent, and as authentic as possible. Students should be presented with problems just one step beyond their existing competence and then provided with assistance for the students to reach independent mastery. Moreover, students should be fully informed of the purpose of the assessment and be partially responsible for their own evaluation.

The study of agriculture provides many opportunities to apply the principles and model of FCL. Here we focus specially on the notion of consequential tasks that "trap students into thinking deeply." Some consequential tasks require students to perform for experts, teach others, act upon personal stake, solve biological and social problems, or respond to the needs of interdependent relationships. Table 1 identifies examples of consequential tasks and how they can be applied in agricultural education.

Clearly this is just an overview of a rich and exciting instructional program—one that appears to have positive effects on student learning. The concept of a consequential task challenges all educators to think deeply about what we ask students to do. Valuable and important tasks stimulate student interest and curiosity, encourage effort and engagement, lend themselves to meaningful assessment, and prepare students for life outside the classroom. Consequential tasks, such as caring for other living things, have been a strength of much of our work in agricultural education. By attending to this and other aspects of FCL, we may continue to enhance the learning of our students.

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Anita Woolfolk Hoy is a Professor of Educational Leadership and Policy at The Ohio State University.

Neil Knobloch is an Instructor in Human and Community Resource Development at The Ohio State University.

Table 1. Examples of consequential tasks and their applications in agricultural education.

CONSEQUENTIAL TASKS	APPLICATIONS
Performing and Teaching • For experts • As experts	**Leadership** • Students demonstrate parliamentary procedures for experts such as FFA officers, school board or civic group. • Students become experts on a topic or task and teach younger students, such as at a farm safety camp or agricultural literacy program.
Acting upon Personal Stake • Student interests • Ownership & financial risk • Self-development	**Agricultural Business** • Students play a board game called The Farming Game® with no paper money and they keep financial statements that must be balanced at the end of the year (round) before they can proceed to the next year. • Students create a cover letter and resume, post it on the Internet, and receive feedback from prospective employers in the community to schedule an interview.
Solving Biological and Social Problems • Plant or animal project • A plan to minimize social conflict	**Animal Science** • Students receive a guppy fish that they take home and care for during the course. They can keep the fish if it lives, but they must pay for it if it dies. They keep journals of their project which must include the concepts and knowledge learned in class. • Students work on a real case that affects them and their community such as a large livestock confinement that is proposed to be built within a mile of the school or their home. They present their plans to local stakeholders.

Teaching Students to Think: Practical Applications of Bloom's Taxonomy

By Anna L. Ball and Shannon G. Washburn

Bloom's Taxonomy is a staple of teacher education. We've all been familiarized with Bloom's knowledge, comprehension, application, synthesis, analysis, and evaluation levels. Bloom challenged educators, through this hierarchical classification system to, "think about the objectives they write, the questions they ask, and the test items they construct" (Eggen & Kauchak, 1994). Given the rapid advances in technology and information access, an abundance of educational literature (*Secretary's Commission on Achieving Necessary Skills* (SCANS), 1991; National Research Council (NRC), 1996; and *Goals 2000*) has been produced charging educators with the tasks of providing a workforce of individuals with adequate analytical, problem solving, and critical thinking skills. While we may not review every objective, classroom activity, or test question and cross-reference it with Bloom's Taxonomy, we are certainly mindful that teaching and learning should extend beyond the knowledge level, challenging our students to think and solve problems in real-world applications.

Agricultural Education as a discipline has reveled in its "hands-on" and "applied", approaches to teaching and learning which suggests teaching that extends well beyond the knowledge and comprehension levels of Bloom's Taxonomy. Are we really doing this? Do *all facets* of our teaching truly challenge students at advanced levels of thinking? For example, are we asking students to conduct experiments in the greenhouse testing the effects of plant nutrient deficiencies as a viable "hands-on" activity, but then giving them an exam that asks them to recall only the most basic knowledge-level facts? The value of the activity that challenged students at the *evaluation* level of the taxonomy is significantly diminished when students are assessed at the *knowledge* level. Furthermore, do our classroom objectives, teaching strategies, and methods of assessment align with one another and are they congruent with our cognitive goals for instruction? For example, do we *lecture* to students regarding concepts that we ask them to *apply* on a performance-based examination? This type of misalignment between teaching methods and assessment strategies creates not only a frustrating environment for students, but also a situation for student failure.

In practice, Bloom's ideas are often limited to their application while writing course objectives for administrative approval. How often do we look past this superficial use of Bloom's theory and critically examine the levels at which we expect students to perform? How often do we review whether we are challenging students to move to higher levels of thinking and learning? Agricultural education has promoted itself as the "hands-on" and "applied" learning program in schools. By resting on these laurels, we run the risk of failing to challenge our students beyond the application level. Application of knowledge has its place in agricultural education and we have established our ability to help students *do* the things we teach them to do. However, by failing to move beyond the doing level, we are not equipping students to think through difficult situations when we aren't there to help them.

The notion that we're not frequently moving *beyond* Bloom's application level is a concern. We need to continue to move "up" Bloom's ladder and bring analysis, synthesis, and evaluation into our students' experience. What we may not realize is that we already possess the skills as effective "hand's-on" teachers to step to the higher rungs of Bloom's ladder. Take a walk through the halls of your high school and peer into the classrooms of some of the outstanding teachers in the school. What will you see? Will the students be sitting quietly hanging on every word of a 50 or 90-minute lecture? No! Effective teaching *is* "hands-on," it *is* "applied," and it *is* "experiential." In essence, effective teachers, regardless of the discipline, engage their students in the learning process, and they strive to challenge their students at levels of cognition beyond simple recognition and recall of facts. While we often say that we teach using hands-on learning, this term does not define agricultural education alone; it simply describes a host of effective teaching techniques.

We often hear about the need to integrate "academic" content within our curriculum. Cross-curricular instruction can do more than make our administrators happy and make us look good in the school newsletter. The true benefit of teaching across the curriculum is that it has the potential to make connections for students to the "real world" of their lives – school! What better way to help our students attain the synthesis or analysis levels of Bloom's Taxonomy than by challenging them to make mental connections between what happens in their other courses and what we are teaching.

Finally, to help our students prepare for their ultimate entry into the challenging world of work, we need to equip them with the ability to evaluate difficult situations and arrive at creative solutions to unprecedented problems. This ability *can be taught* to students, and in agricultural education, we have the ideal topic and environment in which to do so. We should make an effort to take advantage of our daily opportunities to challenge students to solve problems and make decisions when appropriate. These situations may include: resolving conflict among peers, proposing solutions to environmental or political issues, anticipating the "look" of agriculture 25 years from now, or finding ways to "build a better mousetrap" in the agricultural mechanics lab.

We, as agricultural educators, need to determine ways in which to utilize Bloom's Taxonomy in our teaching to challenge our students at the levels of cognition that have become increasingly valued in the ever-changing workforce of the 21st Century. We should challenge ourselves to critically analyze our teaching methods and our assessment strategies. We should reach beyond the assumption that we are merely "applied" because we are agricultural education. Finally, we need to examine the alignment between instructional objectives, instructional strategies, and assessment techniques within the appropriate level of Bloom's Taxonomy to increase the efficiency and effectiveness of our teaching, to decrease students' levels of frustration with misaligned expectations, and ultimately, increase the success of students' thinking at higher levels of cognition.

Ten simple ways to increase your students' cognitive abilities[a]

1. Make a concerted effort to **observe your colleagues** and incorporate some of their instructional approaches.

2. Find ways to **reward and encourage** your students for reading pertinent information outside the classroom and challenge them to think about what they have read.

3. Examine your introductory courses to find areas to **encourage higher cognitive learning** early in students' agricultural education experience.

4. As you **select in-service workshops or continuing professional education** classes, seek out ones that provide suggestions for increasing the cognitive level of your instruction.

5. **Create an interactive learning atmosphere** by limiting your involvement to being a discussion facilitator on debatable topics.

6. **Expect your students to clearly explain and defend their thoughts** in writing and orally.

7. **Model problem solving** for your students through think-out-loud exercises. Listen to them do the same. Examples include reciprocal teaching and think-pair-share exercises.

8. Rather than making all the connections for your students, ask them to **apply new information** to real-life examples.

9. Require your students to **envision the world of agriculture** in the future. What will be different? What will be the same? What challenges will arise as a result?

10. Encourage students to **explore the global challenges** and implications of local issues.

[a]Note. From "Increasing Opportunities for Students to Think in College Classrooms: A Faculty Intercession Program," by M. S. Whittington, 1999, NACTA Journal, 43 (2), p. 32. Adapted with permission.

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Anna L. Ball is an Instructional Development Specialist in the Program for Excellence in Teaching at the University of Missouri.

Shannon G. Washburn is a Graduate Assistant at the University of Missouri.

Utilizing the "Elements of Reasoning" to Teach

By Rick Rudd and John Ricketts

I remember a student in my high school agricultural education program named Isaac. He was a confident and opinionated young man who never missed a chance to enter an argument or state his opinion. I recall a day when he adamantly argued that he could drive his ATV up a 90 degree incline. When I placed a framing square on the table and demonstrated what 90 degrees looked like he was still clinging to his position as he stated, "I can drive up a 90 degree incline if I get up enough speed first." Although Isaac surely does not represent every student, his poorly developed reasoning skills do reflect a problem with our middle and high school students across the country, in career and technical, and non-career and technical education programs.

Teaching students to think "in" and "about" agriculture is a challenge for all agriculture teachers at every level of instruction. From the agriculture in the classroom teacher to the middle and high school teacher, to the university professor, we all need to spend time thinking about how we can teach students sound reasoning skills.

We would like to propose a tool for use in secondary agricultural education programs that could help the Isaacs (and Irenes) in our classes. This tool, a modified version of the Elements of Reasoning (Paul, 1995), is widely utilized in education and has proven to be invaluable when teaching students reasoning skills they can apply in agriculture and in life (Figure 1).

The uses of this tool vary from problem solving to writing essay questions, from thinking through decisions to posing an argument. When we make full use of this teaching tool, we can expect our students to enhance their critical thinking skills, make better decisions, evaluate information more thoroughly, and develop better reasoning skills. We propose that agricultural education teachers take the time to teach students how to use the elements of reasoning in their classrooms and laboratories and then hold students accountable for using the elements of reasoning by evaluating their use of this thinking framework.

The seven elements of reasoning are purpose and objectives, information, facts, and data, assumptions, data interpretation, concepts and theories, points of view, and conclusions, implications, and consequences. Each element is considered in the reasoning process. Students are taught the framework and its use and are then encouraged to apply it to real situations.

Let's look at an agriscience example to demonstrate how a teacher might utilize the "Elements of Reasoning". Students are faced with a greenhouse management problem where they need to decide on the plants to produce for the next year. The students are interested in profit maximization as well as producing plants that are easy to grow. After posing the problem to the students, the teacher could lead them through the decision making process by utilizing the elements of reasoning.

To begin, the teacher would clarify that the students understand the problem, situation, or question to be answered. It is particularly important to keep the purpose of our thinking at the forefront of the reasoning process in order to avoid getting side-tracked. From this point, it is possible to address the remaining

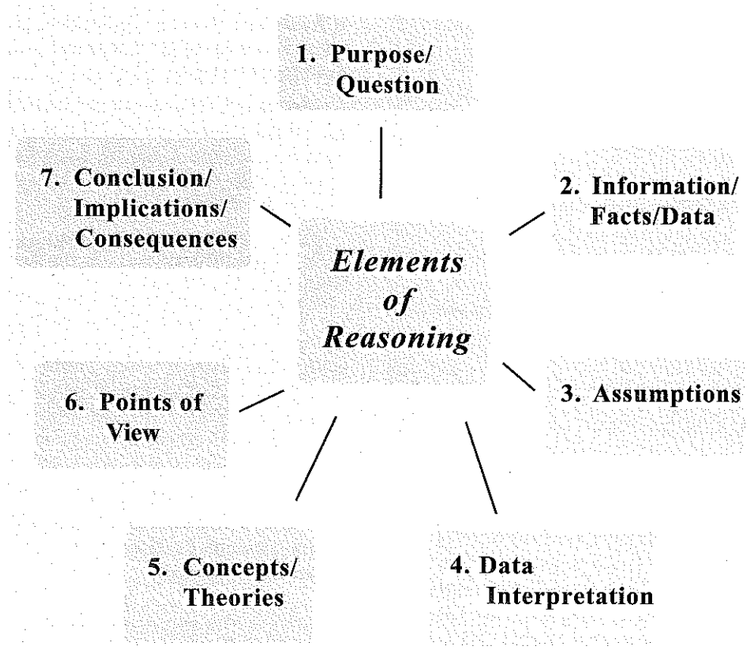
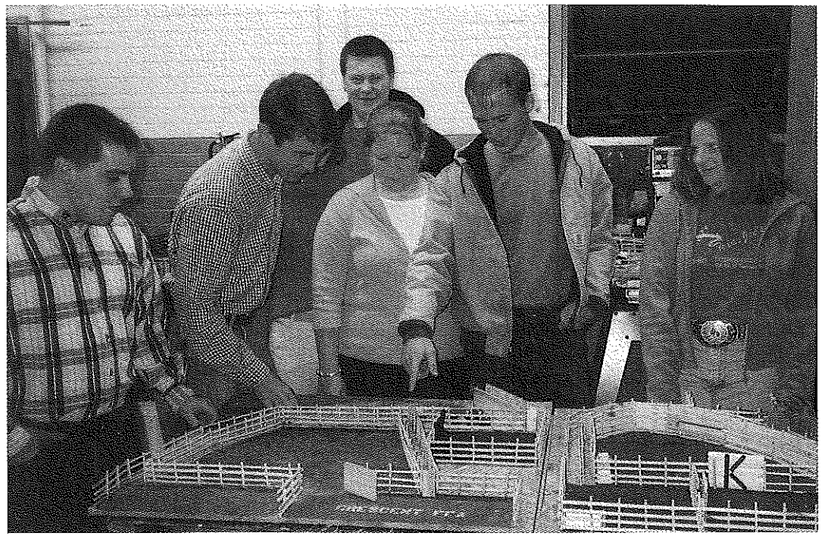


Figure 1. Elements of Reasoning



Students in the Cresent High School agricultural education courses designed and built a scale model for cattle working pens. Students then built the full scale pens. (Photo courtesy of Thomas R. Dobbins)

six elements in any way that makes the best logical sense. For the purpose of this discussion, we will move clockwise through the elements.

After clarifying the purpose of our thinking, we could collect information, facts, and data about the question at hand. What types of plants can be raised in our greenhouse? What is the growing season for these plants? Which plants offer high profits while requiring the lowest labor and financial inputs? What kinds of plants would consumers buy? The students will also want to collect market data from previous years, consumer demand information, information about the kinds of plants that thrive in the area, and other information that will aid in their decision.

Next, the teacher would identify assumptions about the purpose or question. What do we presume to know about the situation without having specific data to support the assumption? In this example, we would assume that we can raise plants in the greenhouse, that we have access to fertilizer, water, and raw materials for production. We probably would also assume that we have the expertise to raise the plants selected.

In the data interpretation element, students would be asked to assimilate what they have found and begin to formulate a decision. Perhaps plants are eliminated at this stage while moving others to a "short-list" for production.

The students would then identify concepts and theories related to the question that would help them arrive at a decision. The concepts and theories for this problem would likely include supply and demand, growth requirements for the plants, and greenhouse management.

Seeking the opinions of others is the primary concern of the element "points of view." We want to consider the positions of others facing the same decision. Asking for expert advice, looking at case studies, and studying management plans proposed by others are all examples of this element.

Finally, we want students to come to a conclusion or final decision based upon what they have been able to learn through the elements of reasoning. In identifying their conclusion, they should identify the potential consequences of implementing their decision.

The elements of reasoning serve as an extremely useful tool in teaching agricultural education students decision-making and reasoning skills. Teachers can use this model as an instructional framework, a decision making tool, or for evaluating conceptual understanding.

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Rick Rudd is an Associate Professor at the University of Florida.

John Ricketts is a graduate assistant at the University of Florida.

The Final Presentation

By Billye Foster and Jack Elliot

Teaching is a much broader challenge than many people think. Even within the ranks of educators there is often the myth that it is a simple process. Teaching, *real teaching*, requires commitment and dedication, and understanding of the students, the school and the community in which an educator works. The process of pulling all of these things together is very time consuming. Understanding the importance of that process is a lesson in experiential learning.

John Dewey expressed a definition of the value of experience when he penned,

> *Experiencing like breathing is a rhythm of intakings and outgivings...William James aptly compared the course of a conscious experience to the alternate flights and perchings of a bird.[7]...Each resting place in experience is an undergoing which is absorbed and taken home the consequences of prior doing, and unless the doing is that of utter caprice or sheer routine, each doing carries in itself meaning that has been extracted and conserved (LW 10:62)* (Campbell, 1995).

Those who choose to follow the path of the educator, regardless of their discipline, usually find that an ounce of preparation is worth its weight in gold.

Student teachers at The University of Arizona, enrolled in Instructional Materials Development and Methods for Teaching Agricultural Education courses prepare a one-hour, individual presentation for the faculty at the end of the fall semester. At each presentation, the student presents all of the collected and prepared materials needed for his/her assigned lessons. Student teachers meet with their cooperating teachers in August prior to the beginning of the semester. During that meeting they are given the units they will be teaching the following spring.

Students are presented with a rubric at the beginning of the semester in order to begin preparations for their presentations.

The final presentation ensures that all student teachers are prepared to enter their student teaching experience with the necessary tools to aid in their success. By having these materials completed and ready for use, the student teachers go to their cooperating centers with a roadmap for each class. While they may change and revamp their lessons during their student teaching, they begin with a solid plan to utilize in the classroom. This step permits the students to be involved with the community, supervise SAEs, and attend evening school functions rather than spending all of their out-of-school time preparing lessons from scratch.

At the beginning of the fall semester the student teachers receive a rubric detailing the requirements for the final presentation.

The presentations include:

~PowerPoint Overview.

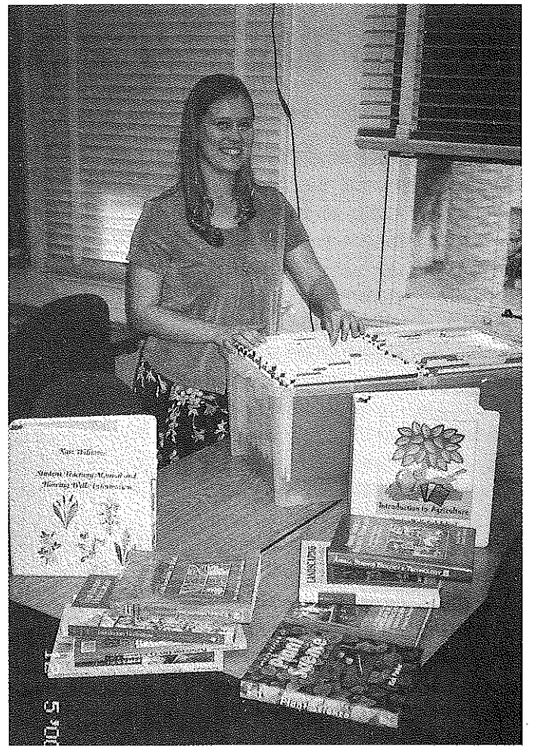
~ All lesson plans, complete with objectives, bell work, transparencies, handouts, tests, quizzes, job operation sheets for lab procedures, references used, project rubrics and realia lists. Realia are "real" things and/or activities the teacher uses to relate learning experiences to the real world around us.

~A syllabus is required for each class (freshmen, sophomores, etc.) taught including course outlines, course assignments, grading scales, late policy, classroom expectations, etc.

~Collected realia for specific units and storage systems for the realia.

~Classroom management procedures, including behavioral expectations for their students.

~Grading system utilizing Microsoft grade book template for EXCEL.



The final presentations ensure that all student teachers are prepared to enter their student teaching experience with the necessary tools to aid their success. A student here displays some of the materials presented. (Photo courtesy of Billye Foster.)

Throughout the semester, the students complete various assignments that are components of the final presentation. At the end of the semester, they schedule an individual, hour long interview with the faculty to complete their final presentation. This presentation simulates a professional interview. The students come in professional dress, prepared to demonstrate and/or explain various components found in their collected paraphernalia.

At the end of the fall semester the students are prepared to enter the classroom in February. The student teachers arrive at their cooperating centers with more confidence, a sense of accomplishment, experience in writing objectives, and lessons that are relevant to their cooperating center and to their chosen career. They can step into their schools with all their units complete and teach a full day.

Moreover, these student teachers can focus on other areas of teaching agricultural education besides lesson planning.

By being adequately prepared for their classroom responsibilities, the student teachers glean valuable time to interact with their communities. Sarah Osborn Welty, the 2001 National Association of Educators (NAAE) Region VI Vice-President, noted in a recent issue of *Making a Difference*, "As agricultural teachers, it is our job to educate others about agriculture and to get the students involved in their communities. We are in a unique position to help build bridges between the school and the community. By getting students involved in the community, we can also get the community involved in the school. When that happens, everyone wins!"

The completion of expected lesson plans, prior to reaching the cooperating teaching site, allows student teachers to have the luxury of spending more time with their seasoned, cooperating teachers and to begin to understand what working together really means. The Final Presentation becomes another link in the chain of preparing a more qualified pre-service teacher and subsequently an enhanced learning environment for today's students. Through the process of this type of experiential learning, student teachers develop a greater appreciation for the value of being prepared.

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Billye Foster is an Associate Professor at the University of Arizona.

Jack Elliot is an Associate Professor at the University of Arizona.

Putting Personality Type Theories in the Driver's Seat

By Tracy Kichtel

When teachers design their curriculum for the first time, what thoughts are going through their minds? What is the driving force behind what is decided? Hedges (1997) suggests four questions in terms of curriculum development: who to teach, what to teach, when to teach, and how long to teach. We know the questions and many of us know the answers for the most part. What drove any of us to make the decisions we did? Possibilities might have included our environment, our background or perhaps, in addition to those, our personality.

There are many kinds of personality instruments. The basis of a more popular series are the theories by Carl Jung, in his book *Psychological Type*. From those theories, the mother-daughter team of Briggs and Myers developed the Myers-Briggs Type Indicator (MBTI). Based upon Jung and the MBTI, David Keirsey developed his theories of Temperament, which lead to a more entertaining typology system called True Colors (True Colors Communication Group, 1998).

Perhaps you were previously exposed to some sort of "type" instruments in methods class, at an FFA conference, or at a teacher inservice. The point is that you were probably exposed to personality types, and were told you could leave the room being able to... do what?

When I administered the MBTI and/or True Colors instruments to my students, I was finding that a majority of the class possessed types that preferred hands-on activities. This could explain several problems I faced as a first-year teacher, such as some minor discipline problems. Now I make a conscious effort to include more hands-on activities in my curriculum. It may not be my strong point, but I do it to meet the needs of my students.

Looking within your curriculum, how can you utilize knowledge of personality types? To begin, you could use the theories to help your students in general and your FFA officers understand others better. If you understand personality typing, then your students can learn some basic information on how other people are different and how to deal with other personality types.

When team-teaching the speech class, we used True Colors to help the class understand different people in the audience. We discussed why doing an audience analysis is so important in knowing who you are speaking to. Another example is the junior agribusiness class. The MBTI and corresponding workshop assisted students in searching for a Supervised Agricultural Experience project and a possible career direction.

Beyond directly exposing your students to personality typology, you can use it when you design activities for groups. The more you are aware of personality types, the easier it becomes to type your students. So, instead of pairing two students who are structured with two kids who are flexible by nature, mix the pairs so you add different strengths to their team. For example, in working with record books, I give examples for the students to work through in groups. First, I try to make certain I have an "expert" in the field relating to the example. Secondly, I make certain to mix the groups in terms of their personality type. If a group of students does not prefer structure, and they work together on record books, that require a great deal of structure, what would you guess the outcome to be? It would likely lead to off-track conversations and very little work. Mixing the personality types helps to keep the entire group focused.

These items are only a few examples of how personality typology can be utilized in the classroom. As a side note, this article was written with personality typing in mind. I started off with a big picture perspective, in terms of personality type, uses in curriculum and then progressed toward more specific examples within particular units. So instead of wondering how to develop your curriculum, let personality types drive you in making decisions for your classroom, SAE, and FFA chapter that meet the needs of your students.

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Tracy Kitchel is a Teacher of Agricultural Education at Archbold High School in Archbold, OH.

My Agricultural Education Story

By Andrea B. Spencer

My Agricultural Education story is one told through the eyes of an agricultural education teacher's spouse, though my story does not begin here. I was an active member in my own home chapter, a FFA World AgriScience Study foreign exchange student, a national finalist in AgriScience and earned my American FFA Degree. I maintain close ties to the FFA and Ag Education by serving on the Iowa FFA Alumni Board and the Iowa FFA AgriScience Fair committee. But nothing or no one has influenced my decision to seek a career as an agricultural education instructor more than my husband and his work.

When we first moved to our new home, we decided that his work with students needed to keep him as close to school as possible. So I made the sacrifice to commute to work.

Things did not start out well for my husband. That first week of teaching was a nightmare. I was not prepared for the emotions I had to deal with when he came home at night. The students constantly compared him to their last agriculture teacher and he felt unprepared. But, he remained firm and eventually mutual respect was established. For the first time ever, the officers started FFA meetings by using opening ceremonies and the word "official dress" actually had meaning.

The chapter grew and became more successful,though the community and school administration did not seem to support the program. I watched as my husband became unhappy with his career decision. He considered leaving the profession all together.

Late in the summer following his second year of teaching, two excellent programs opened. He had a tough time choosing between the two. He opted for the program and chapter he felt needed him most. The students had been involved in the interview process and it was clear that they wanted to learn. So we packed up our belongings and headed west. We bought a small acreage and our home is a place for students to gain hands-on experience. The move to this rural community has at times been a challenge. But the people are friendly. You know you live in a quaint small town when the phone company secretary has your phone number memorized. We are happy here.

So, what was the program like when we arrived? It seemed poor. It had taken only one year with a teacher who didn't care, to run it into the ground. My husband inherited an office, classroom, aquaculture lab, and a room full of junk. There was a thick layer of dust on everything (except the fish; they just had slime). It took the two of us the rest of the summer to clean out the office and classroom. A new computer was hooked up in the office and things were off and running. Aquaculture was a new endeavor and not all that interesting to my husband. He accidentally killed over 100 fish one fateful weekend. But, the corn in the test-plots flourished the next year. Three days into the school year I found myself in a hospital waiting room while my husband had his appendix removed. During the two weeks he was out of commission, I helped him prepare lesson plans. At the end of the two weeks, the students knew me better than they knew my husband. After all, there was an officer meeting and a chapter meeting to attend to and the soils team needed training.

Things are running more smoothly now. My husband is now entering his third year at this school and is more excited than you could ever imagine. The FFA chapter will double this year. His freshman class is 20 strong, they are excited about agriculture. A working alumni chapter has been established, and parents and alumni now call the agriculture room to ask how they can be of assistance. Oh, and that junk room I mentioned – this summer we converted it to an officer leadership development center and the aquaculture lab has been converted to a large plant science lab. This year, we took six National AgriScience Fair finalists along with a national band and a national choir member, to Louisville.

The secret to success? Great students, a good school administration and a supportive community help. The drive of the agriculture teacher plays an important role. When our family calls to contact us, they usually try the phone number at school. As for weekends, Saturdays are mainly reserved for FFA events.

I guess when agriculture is in both your systems and you both enjoy working with students and watching them grow, it's hard not to work together. After all, there's the soil judging team to be trained, AgriScience projects to start, the test-plots will need to be harvested and the chapter reporter, wants photography lessons. There's a chapter meeting this week, and the homecoming float construction to supervise, the member auction to attend, Stacey wants help with her public speech, and then there's the freshman etiquette banquet I promised to prepare and the cookies to bake for the 8th grade exploration class...I think you get the picture.

Andrea B. Spencer is a graduate student at Iowa State University.

A Call to Action for *Project Food, Land & People* ™

By Blance Haning

Project Food, Land & People (FLP_{TM}) is a national curriculum project for grades PreK-12. It is an educational program designed by educators for educators. It accomplishes what three other national curriculum projects, *Project Wild, Project Wet*, and *Project Learning Tree* fail to do, namely, it integrates wildlife, water, and trees with food, land, and people. It appropriately integrates human activity with some of the changes in the earth's ecosystems. An early and continuous exposure to holistic views of the natural world, together with conveyance of an obligation of personal and collective responsibility for the indefinite perpetuation of this world, must become indispensable dimensions of everyone's education.

The Project began in Colorado soon after the release of *Project Learning Tree* when a few voices from the wildernesses of resource conservation, agriculture, education and environmental concerns expressed the need for an organized resource of educational information on food and land. This resource needed to be highly appealing and useful for teachers. These voices eventually became a task force whose goal addressed the relationships between food chains/webs and food production, along with the effects of human populations and their use or misuse of soils. In 1988, FLP was born. Its goals, verbatim from the workbook *Project Food, Land & People, Resources for Learning,* are:

- Stimulate an understanding, through educators and among student populations of the interdependence of food, land, and people.
- Create opportunities for awareness, critical thinking, and skills.
- Develop responsible action-oriented behavior.
- Create dynamic instructional materials designed by educators for the use of educators.
- Develop a broad-based coalition of private and public entities.

The mission statement and guiding principles of FLP further elaborate these basic goals. FLP has private and public sponsors as well as a foundation that support its efforts. FLP has recently become restructured into FLP USA, FLP World Learning Center and FLP International.

FLP Lessons

There currently are 40 lessons in FLP, prepared for grades PreK-3 through grades 9-12. Titles include such topics as plants, seeds, fruits and vegetable, tomatoes to ketchup, insects, tillage, fiber to fashion, cows or condos, apple cores to healthy soil, sound diets, food safety, bees, population patterns and population growth. The 463 page loose-leaf workbook is available from Food, Land & People, 1990 N. Alma School Road, #136, Chandler, AZ 85224 or by phone (602-936-7959) or ordered through the FLP web-site. The workbook was highly rated by the North American Association for Environmental Education's (NAAEE) Environmental Education Materials: Guidelines for Excellence whose criteria involve fairness and accuracy, depth, emphasis on skills building, action orientation, instructional soundness and usability. The lessons have been intensively reviewed, illustrated and evaluated. There is opportunity to add lessons to the notebook as well as to tailor lessons for specific regions or states. The FLP web-site provides complete information about the project, educator resources, sponsorship opportunities, the newsletter, and links that inform about state education standards and FLP lessons. A schedule for Facilitator Workshops is available. The FLP Conceptual Framework shows the convertibility of the FLP lessons to a college course. Evaluation reports and participant comments about Facilitator Workshops document that teachers' weakest points often include agricultural topics and methods; hence, the call to action.

All lessons include the following: title, objectives, critical-thinking and problem-solving skills, list of needed materials, vocabulary list, advice on getting started, procedural guidelines, suggestions on evaluating learning outcomes, extensions and variations on the lesson, related FLP lessons, additional resource materials and estimated teaching time. FLP leaders have translated some lessons into Spanish. New topics such as consumer economics, nutrition, pest management, grazing issues and global trade have been added.

Involvement

There presently are 16 states, called State Affiliates, with FLP licenses. To date, these reside in agencies other than the departments of public instruction. In North Carolina, the Soil and Water Conservation Service holds the license and conducts the facilitator workshops. FLP, of course, encourages each state to correlate the FLP lessons to their individual state standards or core curricula, thereby enriching the state standards.

Personal involvement begins with enrollment in a state affiliate-conducted facilitator workshop that includes 16 hours of active engagement.

An ideal workshop involves:

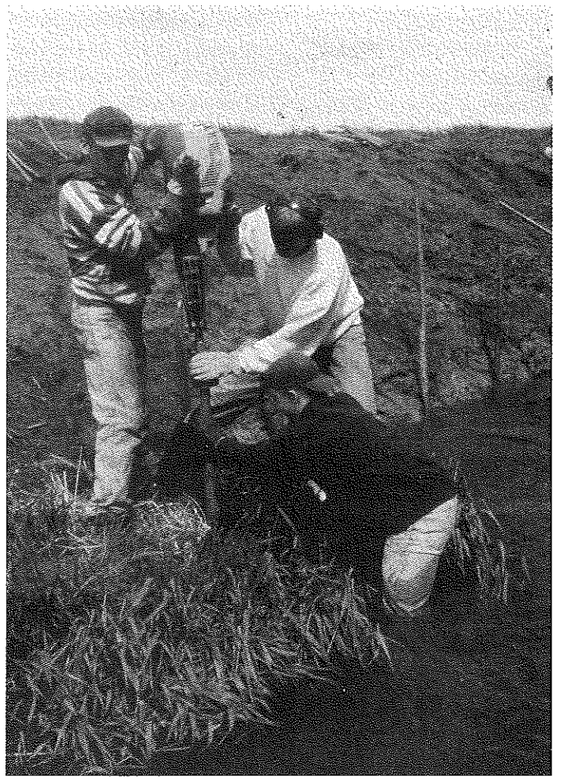
(1) sponsorship so that there are no costs to participants;

(2) a "retreat-type" setting where people can relax while they learn and conceptualize and plan; and

(3) incorporation of one or more field trips that complement the FLP thrust.

Continuing education (CU) credits are available as well as credit towards Environmental Educator Certification. Contact FLP to learn the person in charge of your state affiliate or if you are interested in helping to build a coalition in your state. Ideally, regional participants will co-plan and then conduct FLP workshops for teachers in their area. Through this approach, PreK-12 teachers are educated about "agriculture". They take this information back to their classrooms and teach it, often in very ingenious ways.

FLP Facilitators can market FLP or one or more of its lessons through means other than conducting teacher workshops. For example, displays or hands-on activities can be provided on Earth Day, during National Ag Week, in 4-H and FFA programs, at educator meetings and at state/county fairs or in science museums. A more informed population and future agricultural educators need our involvement.



Project Food, Land & People lessons are available for students grades Pre-K through grades 9-12, in a variety of areas of agricultural literacy. (Photo courtesy of Jasper S. Lee, Demorest, Georgia.)

Summary

Project Food, Land & People is a worthy national curriculum project. Its vision is "futures in which all people recognize the interdependence of agriculture, the environment and human needs; and work cooperatively to promote informed consumer choices and sustainable agricultural practices" (www.foodlandpeople.org). Only science and education can bring this about. Agricultural educators should investigate whether or not their state is officially affiliated with Project FLP and work to assist its adoption or extend its reach. FLP is a project in which we can both teach and learn. We can teach teachers the science involved in the FLP topics and assist them in finding ways to incorporate these topics into their regular science lessons. As science curricula are largely predetermined at all grade levels in public schools, we can also help teachers integrate the lesson topics into history, composition, mathematics, art, poetry, geography, civics, and social science studies. In doing so, we too will learn.

From the College Classroom to the High School Classroom: Theory to Practice

By Leanne McGee, Thomas Dobbins and Donnie King

The demands on agriculture teachers' time are ever increasing; however, teachers must take the time to embellish their learning strategies as well as their technical knowledge to survive in today's educational system.

Four teachers from upstate South Carolina were interviewed for this article concerning learning theories and practice.

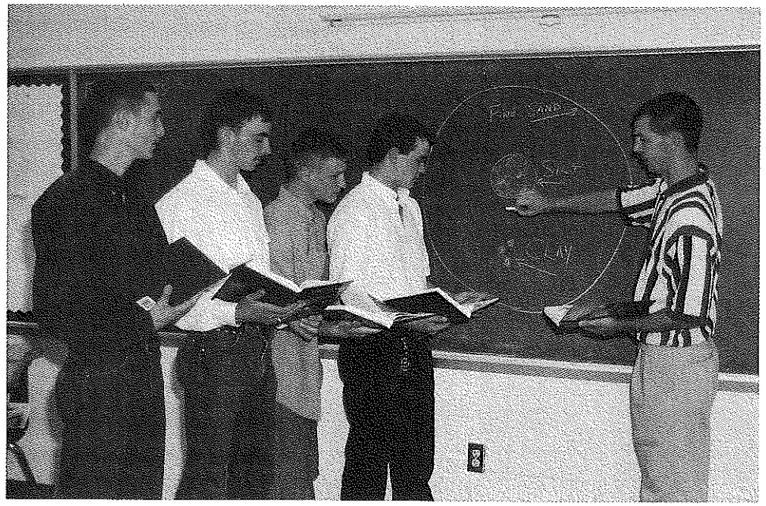
Mr. Glenn Stevens, of Belton-Honea Path High School, in Honea Path, SC has been teaching for 17 years with a program of 184 students. His program varies from livestock production to agricultural mechanics to wildlife management and he is also responsible for one greenhouse.

Mr. David Nixon, of Crescent High School, Crescent, SC, has been teaching agriculture for four years. He is part of a two-teacher program with 116 students. The program is traditional with a focus on agricultural mechanics, livestock production, and forestry.

Mr. Jason Wigington, of Travelers Rest High School, in Travelers Rest, SC, has ten years of experience and a program consisting of 118 students. His program is mainly focused on production and horticulture, with one greenhouse.

Barry Burdette, of Golden Strip Career Center, in Greenville, SC, is in his eighteenth year of teaching, in a primarily horticultural program consisting of 38 students with one large greenhouse. Burdette's students are actively involved with a variety of landscaping projects.

For this set of interviews, several educators throughout the state were asked to identify questions they felt were relevant to finding answers to learning theories and practices.



Teacher presentations and use of student-oriented textbooks in a North Carolina school promote mastery learning and higher achievement test scores. (Photo courtesy of Jasper S. Lee, Demorest, Georgia.

After collecting all of the questions considered to be important by our panel, the information was merged into nine questions that were used in the interviews. Below is a listing of the questions with a brief summary of the responses:

- Do you read professional journals and magazines that contain research in agricultural education?

All of the teachers responded that they do read some type of journal or magazine related to the classes they teach, although they are not able to read as much as they would like, due to time constraints. Each of the teachers indicated they spend much of their time preparing for classroom and laboratory activities.

- Do you feel the available research from professional journals and magazines is applicable to you as a classroom teacher? If not, why?

The teachers indicated that a considerable portion of published research is not applicable to their classroom settings due to the fact that most of the classes have several different learning levels represented. All of the teachers reported that their classes were composed of students ranging from those with special needs to the top students in the school. Therefore, it is very difficult to administer teaching methods that apply to all students at one time.

- Are the teaching methods that we demonstrate in collegiate teacher education programs applicable to today's classroom settings?

Two of the teachers said that they still use what they learned about methods at the university level. The other two said that what they were taught in teaching methods is not being taught today. They believe new teachers are not prepared when they graduate from the university.

- What training did you receive from the university in regard to laboratory instruction?

All four teachers felt that they needed to have more training in regard to laboratory instruction. They indicated that they needed more training in the areas of woodworking, turf grass management, agricultural mechanics, and animal science. Also, they said that it would have been good to have a lab that focused on safety.

- How do you apply learning theories to your everyday teaching?

These teachers assess their students' different learning levels. Administering tests that will allow the teachers to understand the students' learning levels can be useful. However, these teachers indicated that most of the learning theories are common sense and a lot of the teaching methods are based on trial and error.

- What is the benefit of studying learning theories as a part of your pre-service or in-service education?

Each of the teachers indicated that by being aware of different kinds of learners you can try to adjust your teaching to the various learning styles and by doing this you would become a more effective teacher.

- What teaching tool has been the most beneficial to you to help students understand the importance of your lesson/lectures?

Each teacher indicated that experiential learning (hands-on training) and relating the lectures to real life situations represent the best way to help students learn. They indicated that experiential learning afforded students the opportunity to make connections between the classroom and laboratory. A prime example used by one teacher was teaching cattle management by allowing the students to design and build model cattle management facilities out of plywood and dowel sticks. After the model facilities are built, the students are then taken to see actual working facilities to reinforce the learning objective.

- Do you believe that the learning style of a student plays an important part in how a student learns, and why?

All of the teachers believed learning styles play an important part in how students learn. Some students learn better in the classroom than they do in the lab and vice-versa.

- Do you try to learn the learning styles of your students? If so, how?

Each of the teachers attempt to learn the different learning styles of the students. One of the teachers believed that you should learn what works and does not work with your students. However, he further stated that teachers teach in the same style regardless, because that is what is comfortable to them. The other teachers indicated that you should administer a learning style questionnaire and talk with your students to try to learn the different learning styles.

Agriculture teachers at the secondary level have a tremendous responsibility in working with students who have a variety of learning styles and intellectual capabilities within the same classroom. All of our students must be challenged. At the collegiate level, our instruction must prepare our future teachers to deal with the variety of learning styles they will see in their classrooms. Our success at the collegiate level will be measured in the future by how well we are able to prepare our students to be adaptive experts. Can they find the appropriate balance between theory and laboratory practice? Will they have the flexibility and capabilities to adapt their teaching styles to meet the educational needs and learning styles of their students? We must maintain our focus on the preparation of teachers.

Leanne McGee is a Graduate Student at Clemson University.

Thomas R. Dobbins is an Assistant Professor at Clemson University.

Donnie King is an Associate Professor at Clemson University.

A Focus on the Curriculum in Agricultural Education: 2002 Themes

The 2002 theme for The Agricultural Education Magazine will be: **A Focus on The Curriculum in Agricultural Education**

We are soliciting articles that share ideas and activities being used by agricultural educators at every level of the profession. Please consider developing an article on one of the following sub-themes. Articles may be submitted to theme editors or to Robert Martin, Editor of The Agricultural Education Magazine.

January - February 2002, Issue
Theme: *Innovative Curriculum Ideas & Practices in Agricultural Education*. What are some innovative approaches being used to enhance the curriculum? What does the "new" curriculum look like? What are the unique practices in curriculum design and delivery that are being used today? The key component is innovation. How has innovation in the curriculum made a difference?

Theme Editor:
Dr. Brenda Seevers
New Mexico State University
Phone: 505-646-1135
e-mail: bseevers@nmsu.edu

Dealine has passed for this issue.

March - April 2002, Issue
Theme: *The Role of Science in the Agricultural Education Curriculum.* How has an emphasis on science changed the curriculum at the level of delivery? What innovative practices are teachers using that add "science" to the agricultural education curriculum? Has an emphasis on "science" improved the curriculum? If so, how?

Theme Editor: Dr. Barbara Kirby
North Carolina State University
Phone: 919-515-2614
email: barbara_kirby@NCSU.edu

Articles Due to Theme Editor:
February 1, 2002
Articles Due to Editor:
February 15, 2002

May - June 2002, Issue
Theme: *The Role of Career Education in the Agricultural Education Curriculum.* To what extent is career education emphasized in the curriculum in Agricultural Education? Is there a career education plan or does it just happen? How do we help students learn using career education as a focus?

Theme Editor: Dr. Connie Baggett
The Pennsylvania State University
Phone: 814-863-7415
email: bbc@psu.edu

Articles Due to Theme Editor:
April 1, 2002
Articles Due to Editor:
April 15, 2002

July - August 2002, Issue
Theme: *The Role of Community Resources in the Agricultural Education Curriculum.* How do we use community resources in making the curriculum real? Why are community resources important? What difference do they make in the curriculum?

Theme Editor: Dr. Lloyd Bell
University of Nebraska
Phone: 402-472-8739
email: lbell1@unl.edu

Articles Due to Theme Editor:
June 1, 2002
Articles Due to Editor:
June 15, 2002

September - October 2002, Issue
Theme: *The Role of Research in the Agricultural Education Curriculum.* Does research in Agricultural Education impact the curriculum? If so, how? What does research tell us about the curriculum? What are some examples of a linkage between research and our curriculum?

Theme Editor: Dr. Greg Miller
Iowa State University
Phone: 515-294-2583
email: gsmiller@iastate.edu

Articles Due to Theme Editor:
August 1, 2002
Articles Due to Editor:
August 15, 2002

November - December 2002, Issue
Theme: *The Latest Trends in Teaching Agricultural Education.* What trends are helping shape the curriculum and how we teach and help students learn? Where are we going? How will we know when we get there?

Theme Editor: Dr. Tracy Hoover
The Pennsylvania State University
Phone: 814-863-7436
email: tsh102@psu.edu

Articles Due to Theme Editor:
September 15, 2002
Articles Due to Editor:
October 1, 2002