

schools should seriously reconsider their course offerings in international agriculture. Fourth, while agricultural students have diverse backgrounds and majors, they seem to share a similar set of values and beliefs. This suggests that discussions of values and beliefs in agricultural classes can be focused on a few common topics. Fifth, student values appear to be based on more than just economic criteria and, consequently, are not changed dramatically by the students' completing an economics course. While some agricultural economists may be disappointed that their course had little impact on student values, other faculty in the college may be relieved by this finding.

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Classroom Behaviors: What Lessons Can Professors Learn?

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Abstract

Since 1990 the researcher has spent 444 hours with 58 professors at three universities developing a nonthreatening approach to observing faculty as they teach. The five "lessons professors can learn" contained in this paper are couched in the teacher behaviors identified by Rosenshine and Furst (1971): Enthusiasm, Clarity, Variability, Business-like environment, and Opportunity to learn. An examination of these teacher behaviors and the degree to which they are present in college of agriculture classrooms are addressed in this paper.

Introduction

"There are possibly no more significant and exhilarating interactions than those experienced by professors and students when they are together in stimulating learning situations" (Marjoribanks, 1991, p.3). The difficulty,

however, is creating the "stimulating learning situation". If professors are expected to enhance classroom experiences, then there must be a precise understanding of the dynamics of classroom interactions such that the minds of students can be made active. To accomplish this goal, an understanding of the numerous complex factors contributing to exhilarating learning situations is necessary.

A classic study conducted by Rosenshine and Furst (1971) revealed teacher behaviors associated with improved learning and thus set standards for classroom teaching assessment. They concluded that academic achievement reached its highest levels when the following teacher characteristics were evidenced: Enthusiasm, Clarity, Variability, Business-like environment, and Opportunity to learn. An examination of these teacher behaviors and the degree to which they are found in college of agriculture classrooms are addressed in this paper.

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Procedures

Population

In 1990 the researcher co-designed a project that encouraged colleagues in a midwestern college of agriculture to be observed while teaching. Creating a nonthreatening approach was vital to the methodology. The process began by interviewing department chairs to determine faculty members who were "good teachers" (as evidenced by interest in improving teaching, exit interview comments by students, attendance at teaching seminars, and student evaluations of teaching). Ten faculty members, one from each department or school in the college, completed the one-year study of intense observations of classroom behaviors (Table 1). Each faculty member was observed three times during the quarter for a total of 30 hours of classroom observation (Whittington and Newcomb, 1993).

In 1991, a three-year project was undertaken by the researcher in a second college of agriculture located in the western United States. Year one of the research project sought to gather baseline data related to classroom behaviors of participants as they were teaching (Whittington, 1995). Thirty faculty members who taught freshman through senior level courses, were selected. These faculty represented all eight departments or schools in the college. Faculty members were observed six times for a total of 180 hours of classroom observation and assessment.

Year two of the study was an exploratory intercession combining experimental and qualitative methods. However, during year three, 27 professors remaining in

the study were again observed and assessed for their classroom behaviors a total of six times. Classroom observation hours for this year equaled 162.

In 1996 classroom observation was begun in an eastern college of agriculture. Eighteen professors representing 12 departments or schools in the college were nominated by department chairs to participate in the spring semester classroom observations. In three cases, the department chairs nominated themselves to participate. Faculty members were observed four times for a total of 72 hours of observation.

Instrumentation and Methodology

In selecting the instrumentation for observation, the primary variable being measured was discourse (the formal speech or conversation delivered during class) used in the classroom which encouraged students to think beyond the knowledge level. Thus, the variable, cognitive level of classroom discourse was described by employing the Florida Taxonomy of Cognitive Behavior ("FTCB" by Webb, 1970). The FTCB used 55 categories of observable behaviors indicative of the various cognitive levels identified by Bloom's Taxonomy (Bloom, 1956). Validity for this instrument was based upon its direct development from Bloom's Taxonomy and the support generally given to this hierarchy of cognitive behaviors. Reliability for this instrument was established by coding audio-tapes of lectures and establishing Spearman Rho reliability coefficients. Intra-rater reliability was approximately $r = .96$. Inter-rater reliability between previous researchers and the researcher in this study was approximately $r = .98$.

Table 1. Years, institutions, and participants contributing to 444 hours of classroom observation.

Year	Institution	Participants		Total hours
		n	Times observed	
1990	Ohio State	10	3	30
1991	University of Idaho	30	6	180
1993	University of Idaho	27	6	162
1996	Penn State	18	4	72
Total	3	58		444

Second, the researcher used a qualitative, two-column-approach instrument to observe classroom behaviors (Hedges, 1992). This allows observers opportunities to write in column A all observances of behaviors and discourse which lend themselves to reaching the lesson objectives. Column B affords opportunities for the observer to write suggested changes in wording, notations regarding clarifying visuals, or constructive comments for improving the lesson.

Classroom Behaviors Observed

Enthusiasm

Definition - Rapturous interest or excitement; Ardent fondness, eagerness, zeal. From the Latin *enthusiasmus*, inspiration (Morris, 1979, p. 436).

A goal for teachers should be to hear and see expressions of enthusiasm inside the classroom when the learning situation is stimulated to the point of excitement over the subject matter. Many instructors observed in this study were less than enthusiastic. Professors commonly "reside" in a 5' x 10' "box" at the front of classrooms, including the time students enter and exit, the time used to pass back papers, and the time of the actual class session. Hand and arm gestures and voice inflections are used moderately. Smiles are more common.

Lesson 1--

Objective: At the end of this class period I will have learned and used the names of as many students as possible, smiled at all of them, shook hands with most of them, been out of my "teacher space" at least twice, and demonstrated an excitement in my voice for my subject matter.

Through these actions, professors communicate that they are enthusiastic about being in the classroom with students which in turn results in the students being enthusiastic about being there to learn. Enthusiasm is contagious in creating a positive learning environment.

Clarity

Definition - Clearness, lucidity. From the Latin *claritas*, clear (Morris, 1979, p. 247).

According to Joyce and Weil (1972), "The classroom is an extremely complex place in which to work" (p. 93). When a teacher employs a particular method or technique of teaching, it makes the situation at once simpler or more complex. A master teacher can take the very complex and make it simple.

Professors often "know what they are talking about, but can't relate it to students" (as stated by students on numerous occasions). It is extremely rare that professors state or write objectives for the class session on the board. Often that which is written on the board is scattered without

headings or other use of organizational note-taking techniques. Interest approaches or other types of "opening class attention-getters" are not used extensively. Interim summaries, after presenting an important concept, and summaries at the conclusion of class, are scarce.

Professors do, however, come to class prepared with a tremendous amount of information. They also stay "on track" throughout the time of the class session and use excellent examples of major points and concepts.

Lesson 2--

Objective: At the end of this class period I will have written my objectives for the day on the board, organized my thoughts on the board or overhead in a logical fashion with clear headings, begun my class with a 2-4 minute attention-getter, and ended class with a summary of important points and a statement of direction for the course across the next several class meetings.

In essence, professors facilitate clarity by "setting the stage" for that which is to follow.

Variability

Definition - Liable to change; Tending to deviate from an established type. From the Latin *varians*, vary (Morris, 1979, p. 1416-1417).

Students live in a world where average consumers wear more computing power on their wrists than existed in the entire world before 1961 (Pritchett, 1994). They are exposed to modern technology on an hourly basis and are entertained daily by bright lights, flashing symbols, and loud music; to some students, classroom teachers are expected to compete.

How are the classrooms observed in this study vying? Black and white transparencies and black and white chalk boards continue to be the only media used in most classrooms, and often not both on the same day. It is not uncommon for the overhead fonts to be a bit small and crowded for the size of the room. Media, however, is not the only choice for varying a one-hour class period; professors themselves can be tools for adding variability to the hour. Voice, eyes, hands, arms, and movement around the room are not being used to their full potential to bring change to a one-hour class period (such change can assist in holding the attention of students). Handouts, two to three slides, and realia for students to pass around and examine are used moderately at best.

Professors do tend, however, to interject personal stories at appropriate points in the class sessions. This seems to aid in maintaining student interest.

Lesson 3--

Objective: At the end of this class period I will have added color to my presentation, changed the pace of the class every 12 minutes by using slides, handouts, or realia, and experimented with at least one piece of new technology.

Using a variety of teaching strategies enhances student motivation and affords opportunities to "reach" students of differing learning preferences.

Business-like Environment

Definition - Methodical, systematic efficient; Purposeful, earnest. From the Old English *bisignis*, care (Morris, 1979, p. 180).

"If there is one thing I cannot stand it is operating in an unstructured fashion in a structured environment." was the comment made by a faculty member at a professional development conference. Students feel the same way about their classroom time.

Classroom situations in this study tend to be operating in a professional, business-like fashion. Professors arrive for class on time, dress professionally and appropriately for their various classroom situations, and use class time efficiently. Class cancellations are infrequent.

Appropriate language is used by professors and expected from students. Student comments are listened to and addressed positively. Professors are competent and present themselves confidently in the subject matter.

Physical classroom environment is not always ideal. Broken or torn furniture is common as are bent or broken window blinds. Items stacked in corners of rooms and dusty sills and light fixtures detract from the learning environment.

Lesson 4--

Objective: At the end of this class period I will have dressed and conducted myself professionally, treated students equitably regardless of race, gender or ethnic origin, and reported any problems with the physical environment to the appropriate university personnel.

This all creates an environment for learning where students sense that class has purpose and content is important.

Opportunity to Learn

Definition - Opportunity - Advantageous combination of circumstances. From the Latin *opportunitas*, opportune (Morris, 1979, p. 922). - Learn - To gain knowledge, comprehension or mastery through experience. From the Old English *leornian*, learn (Morris, 1979, p. 744).

The power to think, synthesize, and solve problems should be a primary student outcome professors desire. However, Paul (1993) wrote, "Teaching for intellectual skills that enable students to grasp content deeply is rare in education today" (p. 27). It has been advocated that problem-solving types of interactive approaches enhance the intellectual skills of which Paul speaks. According to Joyce and Weil (1972), "probably no teaching is more difficult to master than the interaction-oriented methods because the teacher is dealing simultaneously with personal

matters, cognitive matters and interactive matters and must keep these reconciled and balanced in order to operate in an effective way" (p.94).

In-depth thought-provoking interaction between students and professors is uncommon in classrooms in this study; analysis, synthesis and evaluation levels are reached less than 10% of the time in these classrooms. Students might superficially be asked, "Are there any questions?". Their participation, however, is not truly encouraged. Quiet time (to think, write, or reflect) is rarely provided. Also, other than times when a test or quiz is given, students infrequently receive opportunities to let the professor know that they have indeed grasped a new concept, that is, learned the material.

Course content appears to be up-to-date in the classrooms that were observed in this study. Students were exposed to new writings and current techniques in technical agriculture.

Lesson 5--

Objective: At the end of this class period I will have summarized often, given students moments of "quiet time" to think, chances in-class to write, and opportunities to interact, in-depth, concerning the subject matter.

The sum and substance of these activities are enhanced thinking skills. Such opportunities provided by professors allow students to demonstrate that they are processing and learning.

Summary

The Scenario

A student entering a college of agriculture classroom in 1996 could expect to find a white, 50-year old man, associate professor with no formal preparation in teaching delivering the content of the course. The man will be dressed in casual slacks with a short sleeved soft-colored shirt and a necktie.

The student will not be spoken to as he/she enters the room. The student will sit in a colored, hard-plastic chair, with a desk attached. The chairs will be arranged in long rows, but will be somewhat disarrayed from the previous class. The desks will have writings carved into them. There will be two or three desk/chairs in the room that are broken. Window blinds will need to be straightened or fixed.

Long fluorescent bulbs will shine down on approximately 30-40 white, non-handicapped, non-rural classmates of approximately 2/3 males (many wearing earrings) and 1/3 females (many sporting tattoos). Classmates will range in age from 18-45.

The teacher will be extremely knowledgeable in the subject matter content of the course. The content will be presented in a professional, business-like tone.

An overhead transparency (not colored) with small (often too small) black print and a blackboard with white chalk will be used during the class session. The student will

occasionally see slides used in class.

"Are there any questions?" will be asked two to three times during the class session. However, neither "wait time" nor specific lines of questioning will be used to encourage the student to think in-depth. There will be much "teacher-talk".

It will be extremely rare for the student to arrive for a "canceled" class or a "substitute": these professors do not miss or cancel a class. However, during the last three weeks of spring term, the student can expect field trips, guest lectures, group projects, and student reports.

The student, along with classmates, will begin rustling and packing-up books with two to five minutes remaining in the class session. Thus, the professor will look at his watch and without summarizing the class or encouraging thought, reflection or direction, say, "That's all for today."

Top 5 Lessons Professors Can Learn Immediately (and make a difference!)

#5 - The world was made in color!

Color overheads and colored chalk are easy to use and inexpensive to buy. Slides, posters and realia are usually colorful. These items will brighten classrooms and thereby enhance interest. Although a bit more cumbersome to use in some classrooms, the World Wide Web brings color and life to otherwise dull classrooms -- and is becoming more interactive.

#4 - Embrace diversity.

The students enrolled in college of agriculture classrooms are no longer 18-24 year old, white, rural males. In a nation where diversity is celebrated, it is important that classes utilize the richness of the varied backgrounds and interests of students to enhance the learning environment. Diversity is best embraced when students are given opportunities to "share and talk" as opposed to "sit and listen".

#3 - Our most prized possession is our name.

It is human nature to want to hear our name used in a positive way. The time spent learning students' names will pay dividends in the end in that students will appreciate the attention given to them individually when their name is used in class. Students who do not receive the top or the bottom test score can easily pass through class "unnamed and unnoticed," yet these may be the students who need tremendous encouragement.

#2 - Interest is contagious.

Professors make great strides in motivation by using student needs and ideas when creating the class syllabus. The "interest nucleus" will continue to

spread as students become a valued component in planning the course. Once one student becomes excited about a topic or concept, the interest "rubs-off" on other classmates.

#1 - Plug them in, turn them on, tune them in!

Choosing instructional materials that elicit student's thinking, not just verbalization of information the student thinks the teacher desires (Glover et al., 1990) is critical for actively engaging students in the learning process. Since thinking is interesting while memorization is uninteresting (Lancelot, 1929), subject matter must be presented as a problem-solving process rather than simply as knowledge.

Will the radio work if it is plugged-in, but not turned-on? Will the radio work its best if it is plugged-in and turned-on, but not tuned-in? Professors must engage in a three-step process with students: **Plug them in** by using their needs and interests as the nucleus from which to build the course. Then lay out the course with clear directions and expectations. **Turn them on** every class period with enthusiasm for the subject matter and a 2-4 minute interest approach or attention-getter at the beginning of each session. **Tune them in** by holding their attention through using variability. Changing delivery modes every 10-12 minutes will result in higher levels of attentive listening during class.

Conclusion

Observing professors in their classrooms is rewarding. Being face-to-face with numerous learning styles, teaching styles, and personality types offers experiences that educational researchers seldom have the opportunity to enjoy. Acquiring new ideas, delivery methods, and interaction techniques contributes to an expanded teaching repertoire.

As college educators, the climate is ripe for discussing teaching, sharing teaching experiences, and offering pedagogical expertise to colleagues across all disciplines. Four hundred forty-four hours of professor observation indicate there is work to be done--and, that there is a cadre of experienced educators in colleges of agriculture to get it done. The challenge awaits.

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Teaching an Animal Science Discovery Course to Freshman

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Abstract

An animal science discovery course designed to facilitate the transition of first year students to the university, introduce students to current technology and stimulate their curiosity and excitement about the field, and provide a more complete understanding of the career options available to them, was developed and taught. Animal Sciences 110. "Living with Animals and Biotechnology", successfully accomplished these goals. The 1 credit course was a discussion course covering issues within animal science and biotechnology. Students were also required to maintain a notebook of the discussions, find and give a presentation on a recently published article related to the subject matter, and take a comprehensive final examination. Students completing the course felt that the course was a valuable learning experience and the first-year learners enjoyed being involved in discussions with a faculty member. Offering 1 credit

discovery courses may be developed with information provided in this manuscript, does not greatly interfere with the teacher's duties in other courses or in conducting research, and the benefits will more than compensate for the time required to teach this course.

Introduction

During their freshman year students are exposed to a heavy load of required courses and get minimal personal attention, interaction with faculty, and exposure to career options (Donnermeyer and Kreps, 1994; Ellis, 1993). One way to overcome these deficiencies was to have students enroll in an animal science discovery course. Not only did students rate the course highly as a valuable learning experience, they also felt that the format of the course made learning more interesting.

In addition to facilitating their transition to the university, I found that the animal science discovery course improved the impression non-majors had of animal science.

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