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An Examination of the Learning Activities, Cognitive Level of Instruction, and Teacher Immediacy Behaviors of Successful Instructors in a College of Agriculture

Christopher M. Estepp
Sul Ross State University
Christopher T. Stripling
University of Tennessee
Nathan W. Conner
University of Florida
Aaron Giorgi
Florida Department of Education
T. Grady Roberts
University of Florida

The National Research Council (NRC) has indicated that effective instruction in colleges of agriculture should prepare students to enter a dynamically changing workplace by helping students learn to be proficient in 21st century skills. The NRC suggested that effective instruction in colleges of agriculture should encompass a hospitable learning environment that includes a variety of learning activities that reach higher levels of cognition. The purpose of this study was to observe instructors in a college of agriculture who have been deemed successful and examine their teaching behaviors. This study investigated the learning activities used by these instructors, the cognitive level of instruction, and the teaching immediacy behaviors employed. Results revealed that these successful instructors use lecture a majority of the time; however, they also employ a variety of learning activities, such as cooperative learning, discussion, questioning, and individualized application. Additionally, these instructors teach mostly at lower cognitive levels, except when using cooperative learning. Furthermore, results showed that these successful instructors exhibit a moderate number of positive teaching immediacy behaviors.

Keywords: effective teaching; cognitive level of instruction; teacher immediacy; college of agriculture

Recommendations for changing the way undergraduates in colleges of agriculture are educated have included instruction emphasizing critical thinking, problem solving, comm.-unication, and other 21st century skills (Association of Public and Land-grant Universities, APLU, 2009; National Research Council, NRC, 2009). The NRC posited that this need has been driven by societal changes, including increased globalization, environmental problems, changing demographics, and cons-umer influences. Likewise, many agric-ultural employers are also calling for graduates to possess the aforementioned skills (APLU, 2009; NRC, 2009). Recommendations have suggested that in order for colleges of agriculture to meet the needs of society and increase the critical thinking skills of undergraduates, *effective* instruction in colleges of agriculture must incorporate "pedagogical strategies that create hospitable classroom climates supporting diverse learning processes" (NRC, 2009, p. 35). Consequently, it is imperative that instructors in colleges of agriculture strive to provide effective inst-ruction.

Theoretical Framework

The theory that guided this study was Bandura's (1986) Social Cognitive Theory. Bandura posited that learning is not a function of only the environment or only the learner, instead learning and development are achieved by bidirectional interactions between the environment, learner, and behaviors. Bandura termed this concept triadic reciprocality (see Figure 1) and stated that the interactions between the three factors do not have to occur simultaneously or with the same intensity. Bandura projected that in some instances, interactions between certain variables may be very small or non-existent, while in other cases interactions between variables may be strong. In support of the NRC's (2009) recommendations and for the purpose of this study, the researchers specifically examined effective instruction in the learning environment, which represented the environmental aspect of the triadic model. Additionally, in the context of this study, the behavior variable of the model was represented by the 21st century skills desired by employers, while the learner characteristics consisted of the cognitive processes of students.

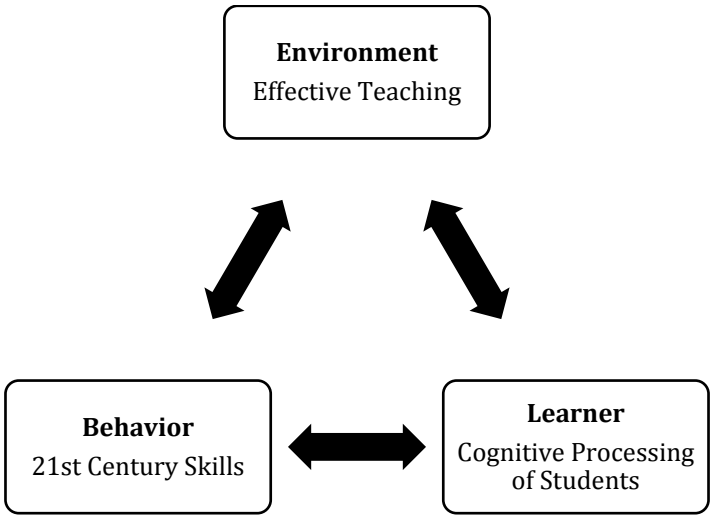

Figure 1. Adapted triadic reciprocality model (Bandura, 1986)

To that end, the researchers in this study sought to create a conceptual framework that would support the concept of effective teaching in undergraduate agriculture classrooms. Through a review of the literature, the researchers found three factors aligned with the NRC's (2009) conception of effective teaching: (a) variability in teaching, (b) cognitive level of instruction, and (c) teacher immediacy. Rosenshine and Furst (1971) examined effective teaching and posited that effective teachers are those who employ a variety of teaching methods. They reported that a positive relationship exists between student achievement and instruction that utilizes a variety of instructional methods and materials. The second factor relating to effective teaching was cognitive level reached during instruction. Rosenshine and Furst additionally indicated that varying the cognitive level of teaching also helps to increase the effectiveness of classroom instruction. Similarly, Whittington (1995) indicated that effective teachers frequently teach at higher cognitive levels in the classroom. Whittington also promoted teachers' cognitive level of discourse as an operationalization for teachers' ability to encourage students' critical thinking, which is one of the desired skills put forward by the NRC. Lastly, teacher immediacy has been identified as a characteristic possessed by many effective teachers (Andersen, 1979; Crump, 1996; Moore, Masterson, Christophel, & Shea, 1996). Therefore, in accordance with the NRC (2009) recommendations, a framework of

effective teaching would include variability in teaching, cognitive level reached during instruction, and teacher immediacy.

Conceptual Framework/Literature Review

Utilizing the literature, the researchers created a conceptual model to guide this study (see Figure 2). Invariably, other variables exist that contribute to effective instruction, but for the purpose of this study and consistent with the NRC's (2009) recommendations, the researchers focused on variability in teaching, cognitive level of instruction, and teacher immediacy. The researchers operationally defined effective instruction as instruction characterized by the use of a variety of teaching methods, a variety of cognitive levels reached during instruction, and the presence of teacher immediacy behaviors.

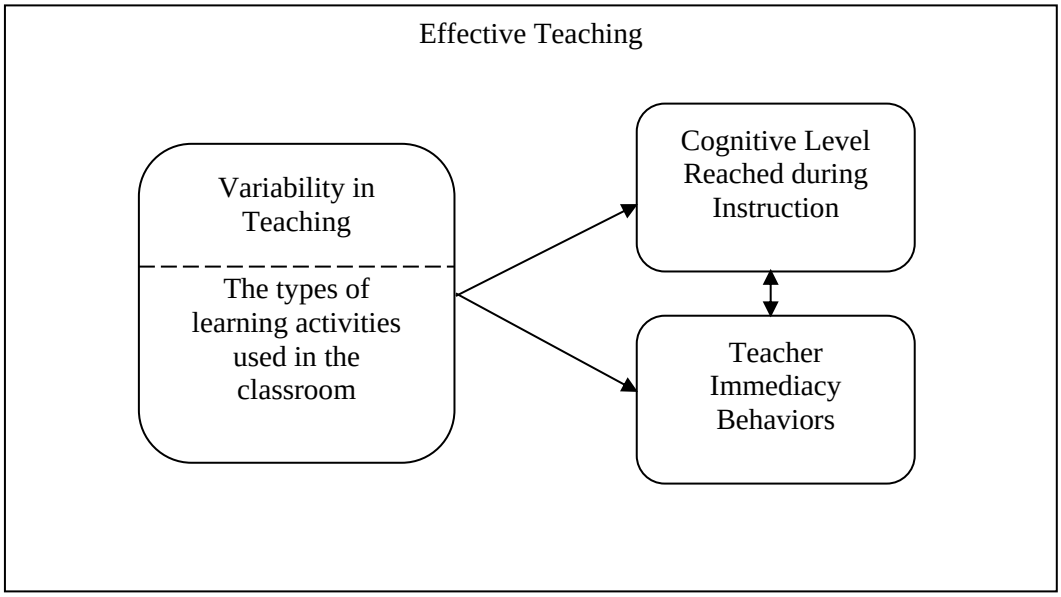

Figure 2. Model of effective instruction

Variability in Teaching

As previously stated, using a variety of instructional activities has been identified as a characteristic of effective instruction (Chickering & Gamson, 1987; Kuh, Kinzie, Buckley, Bridges, & Hayek, 2006; Rosenshine & Furst, 1971). However, one of the most widely used methods of instruction in colleges of agriculture has been lecture (NRC, 2009; Parr, Trexler, Khanna, & Battisti, 2007). Lammers and Murphy (2002) stated that lecturing is valuable, but indicated that recent research data shows the cogency of various non-lecture instructional methods. Similarly, Weston and Cranton (1986) posited that lectures are an effective and efficient means of instruction, but mostly for transmitting information at lower cognitive levels. In contrast, Bonwell and Eison (1991) indicated that learning activities that require more active participation of students can be of greater benefit to student learning. Along those lines, discussion and questioning can be outstanding methods of promoting active learning in the classroom (Svinicki & McKeachie, 2011), while Long (1989) maintained that cooperative learning activities are an excellent means for achieving increased critical thinking and communication skills. Similarly, Parr and Edwards (2004) reported that individualized application instructional methods, such as inquiry-based learning and problem-solving have long been a staple in secondary school-based agricultural education and have

been shown to help improve students' critical thinking skills. The notion put forward by Rosenshine and Furst was that teachers should utilize varying learning activities in each class session, as opposed to a mono-method approach.

In line with this research, instructors have a plethora of learning activities from which to choose. In order to classify and organize learning activities, Roberts, Stripling, and Estepp (2010) proposed a taxonomy of classroom learning activities, which ranged on a continuum from teacher-centered to student-centered and included the learning activities of lecture, demonstrations, questioning, discussion, cooperative learning, inquiry, and individualized application. Along their continuum, Roberts et al. (2010) posited that lecture is a teacher-centered learning activity in which a greater amount of the regulation of learning rests on the teacher, whereas individualized application represents a more student-centered learning activity requiring more regulation of learning by the student.

Cognitive Levels Reached during Instruction

Bloom, Engelhart, Furst, Hill, and Krathwohl (1956) established the Taxonomy of Educational Objectives as a way of organizing learning into different domains. The domain of interest for this study that was proposed by Bloom et al. was the cognitive domain. According to Bloom et al., the cognitive domain refers to the level of cognition required by students during instruction, and consists of several levels of instruction that are arranged in a hierarchical manner.

Whittington and colleagues (Ewing & Whittington, 2007; McCormick & Whittington, 2000; Whittington, 1995; Whittington, Lopez, Schley, & Fisher, 2000; Whittington & Newcomb, 1993; Whittington, Stup, Bish, & Allen, 1997) have investigated extensively the cognitive level of professor discourse in college classrooms and have typically found that instructors in colleges of agriculture tend to teach at lower cognitive levels. For example, Whittington et al. (1997) conducted an observational study in which the cognitive levels of classroom discourse were assessed in accordance with Bloom's Taxonomy. Results of the study revealed that 47% of teaching was at the knowledge level, 33% comprehension, 8% application, 10% analysis, 1.5% synthesis, and evaluation was less than 1%. Additionally, Whittington et al. (1997) found that regardless of class size or course level, low cognitive levels of instruction were prevalent. Furthermore, Whittington et al. (1997) concluded that large classes and freshman level courses offered the fewest opportunities for students to think at higher cognitive levels.

Whittington and Newcomb (1993) investigated the aspired and achieved levels of instruction of selected professors in the college of agriculture at The Ohio State University. Whittington and Newcomb found that approximately 15% of aspired instruction was at the creating and evaluating (high) levels of cognition. However, results revealed that only 5% of the participants' classroom discourse actually occurred at the higher cognitive levels.

In a similar study by Whittington (1995), the aspired and assessed levels of cognitive instruction of professors were examined at the University of Idaho. Similar to Whittington and Newcomb (1993), Whittington (1995) found that most participants aspired for about half of their teaching to be at higher cognitive levels. Results showed however, that only 2% of the classroom discourse was assessed at higher cognitive levels. Whittington concluded that while instructors aspired for their teaching to be relatively balanced across all cognitive levels, most taught and assessed their students at lower cognitive levels.

Teacher Immediacy

The NRC (2009) suggested that effective instruction should include creating a friendly classroom environment. The use of teacher immediacy behaviors by teachers can be one way of creating this type of environment in the classroom (Velez, 2008). Teacher immediacy has been defined as teacher behaviors that increase the perceived psychological and physical closeness between teachers and students (Christophel, 1990). Teacher immediacy consists of low inference verbal and nonverbal behaviors such as smiling, gesturing while teaching, calling students by their names,

praising students' work, actions, or comments, and moving around the room while teaching (Christophel, 1990). The use of teacher immediacy behaviors has been found to be positively related to students' levels of motivation and attitudes toward the teacher and class. Christophel conducted a study in which she investigated the relationships between students' motivation and both verbal and nonverbal immediacy. Results revealed that immediacy was positively related to students' motivation. Likewise, Velez and Cano (2008) found a moderate positive relationship between teacher immediacy and expectancy-value motivation in college students. Furthermore, Giglio and Lustig (1987) investigated the relationship between teacher immediacy and students' attitude toward class. Results indicated that teacher immediacy was positively associated with student attitudes toward class and that 33% of the variance of student attitude was attributed to teacher immediacy. Additionally, Comstock, Rowell, and Bowers (1995) examined the relationship between teacher immediacy and students' attitudes toward the content and instructor. They found that teacher immediacy was a significant predictor of both attitude toward content and the instructor.

Purpose

The purpose of this study was to determine the learning activities employed by successful instructors in the College of Agricultural and Life Sciences at the University of Florida, and describe the cognitive levels reached and teacher immediacy behaviors utilized during the learning activities. The information discovered in this study can begin to help provide a rationale for recommending specific learning activities to professors in order to transform teaching in colleges of agriculture in conjunction with the National Research Council's (2009) recommendations, as well as the National Research Agenda (Doerfert, 2011). While previous research has examined cognitive levels and teacher immediacy in the college classroom, this research will add to the knowledge base by examining cognitive levels and immediacy behaviors that occurred during specific learning activities. The following research questions were examined:

1. Which learning activities do successful teachers in the college of agriculture use during their class sessions?
2. At what cognitive levels are successful teachers in the college of agriculture teaching during the various learning activities used?
3. Which teacher immediacy behaviors are exhibited during the various learning activities used by professors in the college of agriculture?

Methods

Sampling

This study employed a case–study approach (Gall, Gall, & Borg, 2003) of instructors who were deemed to be successful according to several indicators including recommendations from administrators, nomination by the director of the teaching resource center, and/or winning teaching awards either at the college/university level or the NACTA Teacher Fellow's award system. The sample size for this case study included five teachers in the College of Agricultural and Life Sciences (CALS) at the University of Florida who met the criteria for successful instructors. A description of each instructor is provided below.

Instructor 1. Instructor 1 was a white male in his early 60s holding the rank of professor in forestry. He is a NACTA Teacher Fellow and received the CALS Undergraduate Teaching Award in 2004-2005. Instructor 1 has been with the University of Florida for 25 years and typically teaches four undergraduate and two graduate courses per year. He earned his PhD at North Carolina State University where he served as a graduate tea-ching assistant. The class observed for this study was a combined class with undergraduate and graduate students with an enrollment of 15 students.

Instructor 2. Instructor 2 was a white male in his late 40s, and is an associate professor in agricultural economics. He received the 2001-2002 CALS Undergraduate Teaching Award and is a NACTA Teacher Fellow. He has been with

the University of Florida since 1998 and usually teaches four undergraduate and two graduate courses per year. Instructor 2 was a graduate teaching assistant while pursuing his doctorate degree at Michigan State University, and credits his teaching success to teaching workshops, coursework, independent study, and consultations with teaching experts. The class observed for this study was an upper-level undergraduate course that had 105 students enrolled.

Instructor 3. Instructor 3 was an African-American female in her mid-30s. She is an assistant professor in family and consumer sciences. She has worked at the University of Florida for 6 years and received the CALS Undergraduate Teaching Award in 2008-2009. Instructor 3 typically teaches six undergraduate courses per year, and the course observed for this study was an upper-level undergraduate course with an approximate enrollment of 88 students. Instructor 3 received her PhD from Florida State University where she also worked as a graduate teaching assistant. She credits her teaching success to workshops, consulting with teaching experts, independent study, and coursework.

Instructor 4. Instructor 4 was a white male in his early 30s, and is an assistant professor in agricultural economics. He has worked at the University of Florida since 2006 and was the 2010-2011 recipient of the CALS Undergraduate Teaching Award. Instructor 4 typically teaches four und-ergraduate and two graduate classes per year. He earned his PhD at Purdue University where he also worked as a graduate teaching assistant. Instructor 4 credited workshops, independent study, and consultations with teaching experts for his success in teaching. The class observed for this study consisted of 43 students and was an upper-level undergraduate course for agricultural economics majors.

Instructor 5. Instructor 5 was a white female in her late 40s. She is a lecturer in agronomy and specializes in plant production. While Instructor 5 has not received any teaching awards, she is widely recognized across campus as an innovator in the classroom. She has worked at the University of Florida since 2008 and typically teaches five undergraduate and two graduate courses each year. Instructor 5 received her PhD at the University of Florida; however, she did not serve as a graduate teaching assistant. She attributes her success in teaching to workshops, independent study, and consultations with teaching experts. The class observed for this study was an upper-level undergraduate class that had an enrollment of 38 students.

Instrumentation

To determine the learning activities observed in this study, the researchers utilized the Taxonomy of Learning Activities created by Roberts et al. (2010). The taxonomy proposed by Roberts et al. consists of a continuum of learning activities ranging from *teacher-centered* to *social learning* to *student-centered*. The two teacher-centered learning activities on the continuum were lecture and demonstration. The former was characterized by the transmittal of information from teacher to student, while the latter entailed the teacher demonstrating a process. Social learning activities were less teacher-centered and included questioning, discussion, and cooperative learning. Questioning involved the teacher posing questions to students, while teacher-initiated discussion was an activity where the students talk with each other and/or the instructor. The last social learning activity was cooperative learning, which was characterized by students working together in pairs or groups to complete educational tasks. The last group of activities was student-centered activities, which consisted of inquiry and individualized application. Inquiry entailed students working to solve problems, either individually or in groups, whereas individualized application involved students working independently on educational tasks.

The Florida Taxonomy of Cognitive Behavior (FTCB) (Brown, Ober, Soar, & Webb, 1968) was utilized to establish the cognitive level reached by teachers during instruction. The FTCB is similar to Bloom's Taxonomy of the Cognitive Domain (Bloom et al., 1956); however, the FTCB utilizes a slightly different approach than Bloom's. Brown et al. based the FTCB on classroom observation and slightly

altered the cognitive categories proposed by Bloom et al. The FTCB was divided into seven categories; the lower cognitive levels consisted of knowledge, translation, and interpretation, while the higher cognitive levels were application, analysis, synthesis, and evaluation.

Teacher immediacy was measured using the Immediacy Behavior Scale (Christophel, 1990). For the purpose of this study, the researchers modified the use of the instrument, which originally measured students' perceptions of the frequency of teacher immediacy behavior use on a scale of 1 to 5. For the purpose of this study, the researchers observed the videotapes of class sessions and recorded the actual frequency of each observed immediacy behavior. The Immediacy Behavior Scale allowed the researchers to observe 20 verbal immediacy behaviors and 14 nonverbal immediacy behaviors. Reverse coded items on the instrument were counted as *negative* immediacy behaviors.

Data Collection

Upon approval from the Institutional Review Board at the University of Florida, the data were collected during the Fall 2009 and Spring 2010 semesters. Data collection was comprised of videotaping participating instructors during at least two class sessions. A high-definition, digital video camera was used to record the actions of the instructor, and the resulting video was converted to the appropriate format and loaded into the Noldus Observer © software for analysis.

Data Analysis

The Noldus Observer © software suite was utilized to observe and analyze the data in this study. The video was divided into three minute segments for observation and the total number of segments observed was 321. Each three minute segment was examined to determine which learning activities were utilized, the cognitive level reached during instruction, and the teacher immediacy behaviors employed. Analysis included the total duration of time encompassed by each learning activity, along with the average duration of time for each instance of the learning activities. Additionally, the frequencies for the highest cognitive level reached during each activity and the individual immediacy behaviors utilized during each activity were counted. Highest cognitive level reached was reported as a frequency for each learning activity, while immediacy behaviors were reported as a mean for each learning activity.

Gall et al. (2003) indicated that the reliability of observational research is dependent upon three factors, including criterion-related observer reliability, intra-observer reliability, and inter-observer reliability. According to Gall et al., the extent that an observer's ratings agree with an expert's is known as criterion-related observer reliability. Intra-observer reliability is the consistency of an individual observer's measures over time, and inter-observer reliability refers to the consistency between observers' ratings (Gall et al., 2003). To ensure the criterion-related observer reliability of the study, two graduate researchers were assigned to each variable and trained by the lead researcher in proper observational analysis methods. The observations of the graduate researchers were periodically compared against the observational ratings of the lead researcher, who is a nationally known expert in the area of teaching and learning. The intra and inter-observer reliability of the observations were established through the use of multiple raters. Two observers viewed and coded each video session independently, and subsequently the independent observations were compared to check for consistency. If any inconsistencies were discovered, the raters jointly reanalyzed the data where the inconsistencies were found and came to a consensus.

Results

Table 1 presents a synthesis of all observations. The total observed time for the 5 instructors was 16 hours, 4 minutes, 42 seconds. In response to the first research question, successful instructors in the college of agriculture used the learning activity of lecture most frequently (157 segments; average duration was 2 minutes, 48 seconds), which accounted for almost half (45.6%; 7 hours, 20 minutes, 21 seconds) of the total observed class time. Questioning was the second most frequently

used learning activity (141 segments; average duration was 1 minute, 26 seconds) and accounted for 20.9% of the total class time. Cooperative learning was the third most frequently used learning activity (11 segments, average duration was 23 minutes, 26 seconds) and accounted for 26.7% of the class time. Additionally, cooperative learning had the largest average duration of any learning activity. Discussion was the fourth most frequently used learning activity (9 segments; average duration was 5 minutes, 29 seconds) and accounted for 5.1% of the total class time, while individualized application was the least frequently used learning activity (3 segments; average duration was 5 minutes, 4 seconds) accounting for only 1.6% of the total class time. Neither inquiry nor demonstrations were used during the observed class sessions.

Table 1

Usage, Cognitive Levels, and Teacher Immediacy Behaviors by Learning Activity

	Learning Activity				
	Lecture	Questioning	Discussion	Cooperative Learning	Individualized Application
Usage	157	141	9	11	3
Total Segments (N = 321)	157	141	9	11	3
Total Time (Hour:Minutes:Seconds)	7:20:21	3:22:00	0:49:24	4:17:46	0:15:11
Average Duration (Minutes:Seconds)	2:48	1:26	5:29	23:26	5:04
Highest Cognitive Level Reached in Each Segment (N = 321)					
No Observations (f)	19	16	0	2	1
Knowledge (f)	77	42	1	1	0
Translation (f)	10	23	4	0	1
Interpretation (f)	17	22	1	1	0
Application (f)	32	33	2	7	1
Analysis (f)	1	5	1	0	0
Synthesis (f)	1	0	0	0	0
Evaluation (f)	0	0	0	0	0
Teacher Immediacy Behaviors Exhibited in Each Segment					
Positive Verbal (μ)	3.22	5.58	15.56	21.36	7.33
Negative Verbal (μ)	.41	.72	.67	2.55	1.00
Positive Nonverbal (μ)	5.45	2.70	9.78	20.09	6.00
Negative Nonverbal (μ)	1.19	.28	.78	1.82	1.00

Research question two sought to determine the cognitive levels reached during the various learning activities used by instructors. When examining the cognitive levels reached, it is easier to think in terms of lower order and higher order thinking tasks. For simplicity, knowledge, translation, and interpretation were grouped together as lower order levels, while application, analysis, and synthesis were grouped as higher order levels. No evaluation levels were observed during the instruction. During lecture, lower cognitive levels were observed 66.2% (104 segments out of 157) of the time; higher cognitive levels were observed 21.7% (34 segments out of 157) of the time; and no level was observed 12.1% (19 segments out of 157) of the time. No level refers to classroom discourse that did not meet the criteria for a cognitive level on the FTCB. For questioning, lower cognitive levels were observed 61.7% (87segments out of 141) of the time; higher levels were observed 27.0% (38 segments out of 141) of the time; and

no levels were observed 11.3% (16 segments out of 141) of the time. When discussion was utilized, lower levels were observed 66.7% (6 segments out of 9) of the time and higher levels were observed 33.3% (3/9) of the time. For cooperative learning, lower levels were observed 18.2% (2 segments out of 11) of the time; higher levels were observed 63.6% (7 segments out of 11) of the time; and no levels were observed 18.2% (2 segments out of 11) of the time. With individualized application, lower levels were observed 33.3% (1 segment out of 3) of the time; higher levels 33.3% (1 segment out of 3) of the time; and no levels were observed 33.3% (1 segment out of 3) of the time.

Research question three examined the teacher immediacy behaviors utilized during the various learning activities, and the results revealed several interesting observations. On average during lecture, instructors exhibited 8.67 positive behaviors and 1.60 negative behaviors. When asking questions, instructors displayed on average 8.28 positive behaviors and 1.00 negative behavior. When leading discussion, instructors had on average 25.34 positive behaviors and 1.45 negative behaviors. While facilitating cooperative learning, instructors used 41.45 positive behaviors and 4.37 negative behaviors. Lastly, when instructors facilitated individualized application, they employed on average 13.33 positive behaviors and 2.00 negative behaviors.

Conclusions

The instructors in this study used a variety of learning activities, including lecture, questioning, discussion, cooperative learning and individualized application. However, no instances of demonstrations or inquiry were observed. According to Kuh et al. (2006), the instructors' use of a variety of learning activities is an indication of effective instruction. Overall, the cognitive level of instruction in the classroom tended to be at lower levels, consistent with findings by Whittington and colleagues (Whittington, 1995; Whittington et al., 1997; Whittington & Newcomb, 1993). Additionally, the instructors in this study utilized just over 53 positive verbal immediacy behaviors and just over 44 positive nonverbal immediacy behaviors.

Lecture was the most frequently used learning activity and accounted for the greatest percentage of class time, approximately 45%. Nevertheless, the average period of lecturing was slightly less than three minutes long. Thus, the instructors in this study inserted a variety of activities into the class period as opposed to adhering strictly to lecture, which is inconsistent with previous literature that has presumed that lecture dominates classroom discourse (NRC, 2009; Parr et al., 2007). In agreement with the findings of Whittington and colleagues (Whittington, 1995; Whittington et al., 1997; Whittington & Newcomb, 1993), the instructors in this study reached mostly lower cognitive levels during lecture, which supports the argument by Weston and Cranton (1986) that lecture is an effective means of transmitting lower cognitive level information. Furthermore, the instructors observed in this study exhibited just over eight positive immediacy behaviors during lecture.

Questioning was the second most frequently used learning activity, accounting for about 20% of class time. However, individual question sessions lasted the shortest amount of time of any learning activity, at approximately one-and-a-half minutes. Moreover, instructors typically reached lower cognitive levels during their questioning sessions. Svinicki and McKeachie (2011) stated that questioning is an excellent way to reach higher levels of cognitive discourse in the classroom; however, in light of the lower cognitive levels reached during questioning in this study, perhaps the instructors observed have not been instructed in proper questioning techniques. During the questioning, instructors exhibited a few positive verbal and positive nonverbal teacher immediacy variables and almost no negative verbal and negative nonverbal behaviors.

Cooperative learning was used infrequently by this group, but accounted for just over 25% of the observed class sessions, as the duration of each cooperative learning segment was just over 20 minutes. What is more, during cooperative learning segments, instructors reached higher cognitive levels a majority of the time and exhibited the greatest number of positive verbal

and nonverbal teacher immediacy behaviors. These results are consistent with Long's (1989) idea that cooperative learning serves as an excellent way to guide students into higher levels of cognitive processing. Additionally, cooperative learning is one way to implement more active learning into the classroom, which Bonwell and Eison (1991) and Kuh et al. (2006) suggested should improve student learning.

Discussion was used infrequently in the observed courses, accounting for only about 5% of the total class time. The average discussion segment was just over five minutes long, and instructors typically reached lower cognitive levels. According to Svinicki and McKeachie (2011), many students are not accustomed to participating in meaningful class discussion, and therefore will not contribute as readily to the discussion. Perhaps this could be a contributing factor to the infrequent use of discussion by the instructor. Nonetheless, while using discussion instructors did exhibit a moderate number of positive verbal and positive nonverbal teacher immediacy behaviors and very few negative behaviors. Christophel (1990) suggested that the use of more immediate teaching behaviors creates more positive student attitudes toward the subject and instructor, which might lead to increased participation.

Lastly, the instructors observed in this study used individualized application the least frequent of all the learning activities. The cognitive levels reached during instruction were equally distributed, and instructors exhibited a few positive verbal and positive nonverbal teacher immediacy behaviors. The instructors in this study failed to fully utilize the benefits that individualized application activities might offer.

According to Bandura's (1986) idea of triadic reciprocality, the factors of effective instruction, operationalized as learning activities used, cognitive levels reached, and immediacy behaviors used, should impact students' cognitive processing and their use of 21st century skills. Thus, the variety of activities used in this study (Kuh et al., 2006; Rosenshine & Furst, 1971), the various levels of cognitive discourse reached (Whittington, 1995), and the immediacy behaviors employed (Christophel, 1990) should have an effect on how students think about the material being taught. Furthermore, Bandura posited that learner variables, in this case the cognitive processing by students, will impact behaviors (use of 21st century skills). While the instructors observed in this study did not execute all of the learning activities to their fullest potential, according to the operationalization of effective teaching in this study, the instructors observed did demonstrate characteristics of effective teaching.

Recommendations and Implications

The results of this case-study represent a group of five successful teachers in the College of Agricultural and Life Sciences at the University of Florida, therefore the results should be considered in this context. The fin-dings of this study are, however, consistent with prior research about effective teaching and could be considered promising in the quest for better teaching at the undergraduate level.

The first recommendation from this study is that college of agriculture instructors should implement a variety of learning activities into their teaching repertoire. Rosenshine and Furst (1971) indicated that variety was one characteristic of an effective teacher, and the results of this study agree, in that successful teachers in this case utilized various learning activities. A second recommendation from this study is that lecture should be utilized for the dissemination of lower cognitive level information, while higher order thinking is better accomplished through other activities, such as cooperative learning. Moreover, if professors desire to teach at higher cognitive levels and create a hospitable classroom environment, they should consider implementing more cooperative learning into the classroom. A third recommendation resulting from this study is that instructors in colleges of agriculture should consider utilizing more active learning strategies, such as cooperative learning, discussion, and individualized application in their classrooms. Lastly, instructors in colleges of agriculture could benefit from faculty development programs designed to help inst-ructors improve their teaching. These programs should focus on helping instructors utilize a variety of active learning activities, understand how to

teach at higher cognitive levels, and how to become more immediate in their teaching.

This research has provided more questions for the profession regarding the use of learning activities, cognitive level of discourse, and teacher immediacy that should be investigated. For instance, what relationships do these three variables have with student learning? What teacher and student variables are significant in these relationships? What role does teacher immediacy play in learning and critical thinking? Does the cognitive level of discourse predict student engagement? How can instructors develop a classroom culture of students participating in class discussion, and what relationships between student comfort level and participation predict participation in class discussions? Additionally, experimental studies should be conducted to determine the effects of the various learning activities on student learning.

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CHRISTOPHER M. ESTEPP is an Assistant Professor of Agricultural Education in the Animal Science Department at Sul Ross State University, RAS 108, Box C-11, Alpine, TX 79832, cestepp@sulross.edu

CHRISTOPHER T. STRIPLING is an Assistant Professor in the Department of Agricultural Leadership, Education and Communications at the University of Tennessee, 320B Morgan Hall, 2621 Morgan Circle, Knoxville, TN 37996-4511, cstripling@utk.edu

NATHAN W. CONNER is a Graduate Teaching/Research Assistant in the Department of Agricultural Education and Communication at the University of Florida, PO Box 110540, Gainesville, FL 32611, nathan.conner@ufl.edu

AARON GIORGI is the CTE Curriculum Administrator for Region IV of the Florida Department of Education, 107 4th Avenue South, Coquina 216A, St. Petersburg, FL 33701, agiorgi@ufl.edu

T. GRADY ROBERTS is an Associate Professor of Agricultural Education in the Department of Agricultural Education and Communication at the University of Florida, PO Box 112060, Gainesville, FL 32611, groberts@ufl.edu