

# **Beliefs About a Constructivist Model for Teaching Compared with Traditional Teaching Methods Among Teacher Education Students**

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## **Abstract**

The educational reform literature includes the need to develop students' abilities in thinking and reasoning. This theme is primary among the factors associated with teaching and learning in the research literature as well. A focus of these efforts within educational research is a growing movement based on constructivism (Brooks and Brooks, 1993). Constructivism as a theory of learning is based on the proposition that knowledge cannot be "given" to someone, only information can be given. True knowledge must be "constructed" in the mind of the learner, within the context of that individual's past experiences and knowledge base.

This study sought to describe the beliefs held by pre-service teachers about teaching and learning based on component principles of the constructivist model of teaching. The populations for this census study consisted of students in a general pre-service teacher education course, and students in a methods of teaching agriculture course. This was a descriptive study, using a written questionnaire. Thirty-two matched items represented 16 components which sought to operationalize major constructs of the constructivist model of teaching.

The findings in this study indicate that, when traditional approaches to teaching and learning are matched with constructivist-based approaches, students generally prefer the constructivist-based approaches. Agricultural education historically has been popular to many students because it provides for alternative teaching and learning strategies, when compared with other high school courses, through hands-on application. It is likely that hands-on practice is one avenue which allows students the opportunity to "create" knowledge within their own minds.

## **Introduction**

The current educational reform movement began in the 1980s and, interestingly, continues into a new century. An entire national movement that began as a white paper without the citation of any empirical evidence to substantiate its claims ("A Nation At Risk," National Commission on Excellence in Education, 1983) continues as a campaign at all levels of politics and government. During those two decades, educational reform has focused both on the local school and on the preparation of teachers.

Whatever reforms are eventually agreed to, it will be the classroom teachers who will be responsible for implementation. Who are our teachers? Where do they come from? What types of education have they experienced? What do they believe about teaching and learning? To what extent are they products of their own environments? An analysis of the beliefs about teaching and learning held by pre-service teachers could prove useful in addressing their role in educational reform.

If current and prospective teachers are the products of their own education, what have they experienced? W.R. Wees, in Nobody Can Teach Anyone Anything (1971) made some interesting observations about schooling that are relevant in the year 2000. Referring to an earlier period in Western culture he noted,

The Industrial Revolution forced hordes of youngsters into school.... With so few teachers, somebody had to invent a way to teach so many newcomers.... Mr. Lancaster's invention was quite simple. He just herded a thousand youngsters into a big room, sat them at rows of benches, appointed older children as monitors, and taught the lesson to the monitors – who went down, each to his own row, and retaught the lesson to the assigned benchful of children who dutifully repeated it back to the monitor (p. 1).

Wees noted that new innovations have changed the medium, the use of the monitors has been replaced with educational technologies, but “the same sort of thing goes on in 95 percent of the classrooms in the Western hemisphere – from the rote memorization of word symbols to the memorization of dates, names, and descriptions of events” (p. 2). Wees observed that this process, “... becomes really amusing in university (classrooms) where students buy one another's notebooks, lab notes, and essays so that they can submit copies to get their term grades. If teachers are to employ effective methods and procedures for teaching and learning in the classroom, where must they first encounter them?” (p. 2)

Glaser (1992) called the memorization of facts “throwaway information.” He said that in quality learning environments all of the information on what is studied is always on hand, not only during class but during all tests.

No student should ever suffer academically because he or she forgot some fact or formula. The only useful way to test students' knowledge of facts, formulas, and other information is to ask not what the information is, but where, when, why, and how it is of use in the real world (p. 692).

Glaser posited that the real-world value of what is to be learned should focus on “useful skills,” not on information that has no use in the lives of those who are taught it. “I define a skill as the ability to use knowledge.”

Numerous authors have identified components of effective teaching. (See, for example, Brophy and Good, 1986). Several of these have explored the relationships between specific teacher activities and measurable student achievement. Fewer have explored the multi-dimensional relationships between teaching and student learning. For example, Feldman (in Svinicki and Menges, Eds., 1996) extended the work of d'Apollonia and Abrami (1987, 1988) and Abrami, Cohen and d'Apollonia (1988), and Cohen's (1980, 1981, 1987) meta-analysis on the association between student achievement and various “instructional dimensions.” He identified 21 such dimensions that were statistically significant in their correlations.

A common set of student outcomes in the reform literature is related to the need to develop students' abilities in thinking and reasoning. This theme is primary among the factors associated with teaching and learning in the research literature as well. Means and Knapp (1991) reminded us that cognitive research on comprehension processes has shown the importance of trying to relate what a student learns to what s/he already knows, of checking to see that the new information fits with prior knowledge, and of setting up expectations for what is to follow and seeing whether those expectations are fulfilled. Means and Knapp (1991) suggested a new set of

curricular principles:

- S Focus on complex, meaningful problems.
- S Embed basic skills instruction in the context of more global tasks.
- S Make connections with students' out-of-school experience and culture.
- S Model powerful thinking strategies.
- S Encourage multiple approaches to academic tasks.
- S Provide scaffolding to enable students to accomplish complex tasks.
- S Make dialogue the central medium for teaching and learning (286-288).

A focus of these efforts is a growing movement from within education, based on constructivism (Brooks and Brooks, 1993). Constructivism as a theory of learning is based on the proposition that knowledge cannot be "given" to someone, only information can be given. True knowledge must be "constructed" in the mind of the learner, within the context of that individual's past experiences and knowledge base. "We construct our own understandings of the world in which we live," according to Brooks and Brooks (p.4).

Windschitl (1999) explained that, "Constructivism is premised on the belief that learners actively create, interpret, and reorganize knowledge in individual ways" (p.752). According to Windschitl, a growing number of teachers are embracing the fundamental ideas of constructivist learning, "that their students' background knowledge profoundly affects how they interpret subject matter and that students learn best when they apply their knowledge to solve authentic problems, engage in 'sense-making' dialogue with peers, and strive for deep understanding of core ideas rather than recall a laundry list of facts" (p. 752).

What teacher practices constitute constructivism? Windschitl (1999) called "constructivism a culture – not a fragmented collection of practices" (752). Brooks and Brooks (1993) identified several traits of constructivist teachers:

1. Encourage and accept student autonomy and initiative.
2. Use raw data and primary source, along with manipulative, interactive and physical models.
3. When framing tasks, constructivist teachers use cognitive terminology such as "classify," "analyze," "predict," and "create."
4. Allow student responses to drive lessons, shift instructional strategies, and alter content.
5. Inquire about students' understandings of concepts before sharing their own understandings of those concepts.
6. Encourage students to engage in dialogue, both with the teacher and with one another.
7. Encourage student inquiry by asking thoughtful, open-ended questions and encouraging students to ask questions of each other .
8. Seek elaboration of students' initial responses.
9. Engage students in experiences that might engender contradictions to their initial hypotheses and then encourage discussion.
10. Allow wait time after posing questions.
11. Provide time for students to construct relationships and create metaphors.
12. Nurture students' natural curiosity through frequent use of the learning cycle model (pp. 103-118).

## Purpose of the Study

Understanding the beliefs about teaching and learning held by teachers may provide information in reforming teacher education programs. Further, if pre-service teachers mimic the teaching they have experienced, an analysis of the teaching methods used in all college-level courses taken by pre-service teachers may be of value.

This study sought to describe the beliefs about teaching and learning held by pre-service teachers. Specifically, it sought to explore their beliefs about component principles associated with the constructivist model of teaching. The study was guided by the following research questions:

1. What are the beliefs about several component principles of the constructivist model of teaching and learning held by pre-service teachers?
2. Is there a difference between pre-service teachers of agriculture and all other pre-service teachers in their beliefs about several component principles of the constructivist model of teaching and learning?

## Methods

The populations for this census study consisted of all students in all sections of a general pre-service teacher education course (N = 69), and all students in a methods of teaching agriculture course (N = 18) at the University of Arkansas in the Fall of 1999. Instructors in each section of each course provided the researcher with access to the students for data collection.

This was a descriptive study, using a written questionnaire. Thirty-two matched items comprised the relevant part of the questionnaire. Subjects were asked to respond to each item using a four-point Likert-type scale (1 = "Strongly Disagree" to 4 = "Strongly Agree"). The 32 items represented 16 components which sought to operationalize major constructs of the constructivist model of teaching. The constructs included:

- S sources of content for teaching,
- S the goal of teaching and learning,
- S how students learn,
- S the role of the teacher in teaching and learning,
- S how teachers teach, and
- S assessment of learning.

The instrument was based, in part, on works by Brooks and Brooks (1993), a review of the literature in effective teaching, and procedures used in the development of constructivist teaching materials for a methods of teaching course. Each item pair sought to represent a teacher method or activity based on the constructivist approach to teaching, and a contrasting teacher method or activity based on a traditional approach to teaching.

The instrument was reviewed by a panel of teacher educators from several institutions for content validity. After revision, it was administered to pre-service teacher education students to establish instrument stability. This was done via a test-retest procedure at approximately a two-week interval. The test-retest procedure yielded a coefficient of stability estimate of 0.65. The instrument was administered to all students in all sections of CIED 1002 and AGED 3133 at the University of Arkansas in the Fall of 1999. The internal consistency of the instrument with these

students was found to be 0.95.

Descriptive population statistics were used to summarize and analyze the data. Because data for this study compares two independent populations, inferential statistics were not used.

## Results

The data are presented in Table 1. Matched items, traditional teaching approach and constructivist teaching approach, are paired. In each pair, the traditional teaching approach is listed first, and the constructivist teaching approach is listed second. The obtained mean ratings on each item for both the general teacher education student and the agricultural education student populations are listed. While some differences between the population means between the two groups exist for many items, practical and meaningful differences were not found for most of the items. This indicates that each group of students generally agreed with the other on their beliefs about teaching and learning.

Table 1. Beliefs about teaching and learning held by agricultural teacher education students and other teacher education students.

#	Item	Group					
		All Teacher Education			Agricultural Education		
		N	. <sup>1</sup>	SD	N	. <sup>1</sup>	SD
<u>SOURCES OF CONTENT FOR TEACHING</u>							
24	Course activities and materials should rely heavily on the prescribed text books and work books.	67	2.22	0.54	17	2.12	0.48
5	Course activities and lessons should rely heavily on the use of real-world sources of data, and on student involvement with hands-on materials.	69	3.36	0.51	18	3.44	0.51
6	Instruction should provide technical content about accepted theories of experts.	67	2.67	0.59	18	2.67	0.48
13	Instruction should provide information that helps students to learn to build their own theories.	69	3.22	0.64	18	3.22	0.43
20	Strict adherence to course content that is determined at the beginning of the school year is very important and highly valued.	66	2.61	0.60	18	2.39	0.50
23	The students may help determine the content to be taught and how it is to be taught, based on their interests and learning styles.	69	3.09	0.53	18	3.33	0.48
<u>THE GOAL OF TEACHING AND LEARNING</u>							
1	A primary goal of teaching is to get students to respond with the "correct answers."	68	2.63	0.75	18	2.67	0.59

10	A primary goal of teaching is to help students develop understandings of major concepts rather than detailed content.	67	2.88	0.61	17	3.17	0.53
<u>HOW STUDENTS LEARN</u>							
7	In a student's mind, new knowledge is learned in isolation from other knowledge.	68	1.97	0.57	18	2.11	0.47
31	In an individual's mind, new knowledge is learned within the context of prior knowledge.	69	3.23	0.49	18	3.00	0.34
30	Students should be "instructed in" the subject matter. The instructor is responsible for the students' learning.	67	2.78	0.52	17	2.59	0.51
17	Students should "inquire into" the subject matter. The students are responsible for their own learning.	67	2.49	0.59	18	2.61	0.50
18	Learning should be an activity in which the students spend much of their time mimicking (copying) the activities of the teacher in order to learn the correct knowledge or procedures.	68	2.19	0.63	18	1.94	0.54
29	Learning should be an activity in which the students are presented information or problems-to-solve for which they must seek information in order to internalize and create new knowledge in their own minds.	68	3.09	0.41	18	3.00	0.34
21	Knowledge is something to be <u>acquired by</u> individuals as learners.	67	3.03	0.46	18	3.11	0.32
28	Knowledge is something to be <u>created within the minds of</u> individuals.	67	2.97	0.55	18	2.94	0.64
<u>ROLE OF THE TEACHER IN TEACHING AND LEARNING</u>							
25	Students should understand that the lesson "belongs to" the instructor because he/she is the "expert" and knows how the content will be important to the students in the future.	68	2.35	0.68	18	2.22	0.65
11	Students should have a sense of ownership of the lesson because they are interested in learning how the content is applied to real-world problems.	67	3.03	0.42	18	3.22	0.43
12	The teacher should always decide what is taught and how it is to be taught. The teacher is the authority.	68	2.47	0.72	18	2.11	0.68
22	Teachers should pursue students' questions about the world and try to integrate them into the lessons as the term progresses, even if it means deviating from a fixed course plan.	68	3.26	0.56	18	3.17	0.51
14	In teaching a lesson, teachers should not be concerned with relating students' prior knowledge, or their environment and experiences, with the lesson content.	69	1.71	0.64	18	1.72	0.57
27	In the learning process, teachers should serve as mediators between the students' individual prior knowledge, their environment and past experiences, and the lesson content.	68	3.18	0.45	18	3.06	0.42

15	Teachers should behave as the expert, serving as the source of knowledge, and disseminating information to students.	66	2.73	0.64	17	2.41	0.71
26	Teachers should operate the class in an interactive manner with students, promoting open discussion in the learning environment.	69	3.64	0.48	18	3.28	0.46
<u>HOW TEACHERS TEACH</u>							
3	Students should learn from working primarily alone on course assignments, lab activities, and assessment activities.	69	1.93	0.52	18	1.94	0.23
9	Students should learn from working primarily in groups.	66	2.42	0.56	18	2.72	0.46
4	Course material should be presented in small pieces, with emphasis on learning “basic” skills, before students are given the “big picture” of how everything fits together.	69	2.97	0.66	18	3.11	0.68
19	Course material should be presented so that students have an idea of the big picture first, then taught the basic skills and details of the parts.	67	2.73	0.73	18	2.72	0.67
8	Courses should be taught as unique and separate bodies of knowledge.	68	2.26	0.61	18	2.11	0.58
32	Courses should be taught so students see that the content relates to content in other courses.	69	3.23	0.49	18	3.22	0.43
<u>ASSESSMENT OF LEARNING</u>							
2	Assessing what students have learned occurs almost entirely through testing.	69	1.93	0.65	18	2.17	0.62
16	Assessing what student have learned best occurs through teacher observations of students at work and through student exhibitions.	68	3.10	0.43	18	3.00	0.59

<sup>1</sup>Scale: Strongly Disagree = 1, Disagree = 2, Agree = 3, Strongly Agree = 4

Note: First statement in each pair is “traditional” approach; second statement is constructivist approach.

Sources of Content for Teaching. Using a 4-point Likert-type scale, subjects disagreed with the statement that “course activities and materials should rely heavily on the prescribed text books...” (item 24: GTE . = 2.22; AGED . = 2.12). This statement represents a more traditional approach to teaching. In contrast, the subjects agreed that course activities and lessons should “rely heavily on the use of real-world sources of data, and on student involvement in hands-on materials” (item 5: GTE . = 3.36; AGED . = 3.44). This is an approach to teaching that better represents the constructivist model. Both general teacher education and agricultural education students were neutral in their beliefs that “instruction should provide technical content about accepted theories of experts” (item 6: GTE . = 2.67; AGED . = 2.67). However, they both agreed that instruction should “help students to learn to build their own theories” (item 13: GTE . = 3.22; AGED . = 3.22).

When asked to respond to the statement that “Strict adherence to course content that is determined at the beginning of the school year is very important and highly valued,” each group

was fairly neutral (item 20: GTE . = 2.61; AGED . = 2.67). However, they agreed with the statement, “Students may help determine the content to be taught and how it is to be taught, based on their interests and learning styles.” For this statement, general teacher education students gave it a mean rating of 3.09 while agricultural education students rated it at 3.33, indicating a stronger belief in the statement.

The Goal of Teaching and Learning. Both general teacher education students and agricultural education students were neutral with the statement that “A primary goal of teaching is to get students to respond with the ‘correct answers’ ” (item 1: GTE . = 2.63; and AGED . = 2.67). However, when posed with the statement, “A primary goal of teaching is to help students develop understandings of major concepts rather than detailed content” (item 10), student agreement was more positive (GTE = 2.88; AGED = 3.17). In fact, the level of agreement with this statement was much higher among agricultural education students than for general teacher education students.

How Students Learn. On the item, “In a student’s mind, new knowledge is learned in isolation from other knowledge” (item 7) each group disagreed with the statement (1.97; 2.11). However, they agreed with the statement that “new knowledge is learned within the context of prior knowledge” (item 31: 3.23; 3.00).

Both groups were generally neutral to the statements over who in the teaching - learning process is responsible for the students’ learning (items 30 and 17). Mean responses were 2.78 for general teacher education students and 2.59 for agricultural education students to the statement, “students should be ‘instructed in’ the subject matter ... the instructor is responsible for the students’ learning” (item 30). Similar means were obtained for the constructivist statement that, “students should ‘inquire into’ the subject matter ... the students are responsible for their own learning (item 17: 2.49; 2.61).

General teacher education students and agricultural education students both disagreed with the statement that “learning should be an activity in which students spend much of their time mimicking the activities of the teacher in order to learn the correct knowledge or procedures” (item 18: 2.19; 1.94). Conversely, each group agreed with the statement that, “learning should be an activity in which students are presented information or problems to solve for which they must seek information in order to internalize and create new knowledge in their own minds” (item 29: 3.09; 3.00).

Interestingly, each group agreed with both types of statements (traditional teaching approach and constructivist approach) about the acquisition of knowledge. Item 21, “Knowledge is something to be acquired by individuals as learners” earned mean responses of 3.03 (GTE) and 3.11 (AGED). Item 28, “Knowledge is something to be created within the minds of individuals” earned mean responses of 2.97 (GTE) and 2.94 (AGED).

The Role of the Teacher in Teaching and Learning. Subjects in both groups disagreed that “Students should understand that the lesson ‘belongs to’ the instructor because he/she is the ‘expert’ and knows how the content will be important to the students in the future” (item 25: 2.35; 2.22). Both groups agreed that “Students should have a sense of ownership of the lesson because they are interested in how the content is applied to real-world problems” (item 11: 3.03; 3.22).

On items related to the authority of the teacher in curriculum planning, the general teacher education group was neutral (2.47) on item 12, “The teacher should always decide what

is taught and how it is to be taught. The teacher is the authority.” The agricultural education group disagreed with this statement (2.11). When posed with the constructivist converse statement, “Teachers should pursue students’ questions about the world and try to integrate them into the lessons as the term progresses, even if it means deviating from a fixed course plan” (item 22), both groups agreed (3.26; 3.17).

For the related statements, “teacher should not be concerned with relating students’ prior knowledge ... with the lesson content” (item 14) and “teachers should serve as mediators between the students’ individual prior knowledge ... and the lesson content” (item 27), each group indicated disagreement with the former (1.71; 1.72) and agreed with the latter (3.18; 3.06).

Item 15, “Teachers should behave as the expert, serving as the source knowledge, and disseminating information to students” earned neutral responses (2.73; 2.41). However, item 26, “Teachers should operate the class in an interactive manner with students, promoting open discussion in the learning environment” earned strong agreement from the general teacher education group (3.64) and agreement from the agricultural education group (3.28).

How Teachers Teach. When posed with statements about how students should learn, the subjects in each group did not believe that students should learn “from working primarily alone” (item 3: 1.93; 1.94), but were neutral with the statement that they should learn “from working primarily in groups” (item 9: 2.42; 2.72).

Subjects in both groups agreed with the statement from the traditional teaching model that “Course material should be presented in small pieces, with emphasis on learning ‘basic’ skills before given the ‘big picture’...” (item 4: 2.97; 3.11). The groups recorded neutral to slight agreement with the constructivist - based statement that “Course material should be presented so that students have an idea of the big picture first, then taught basic skills and details...” (item 19: 2.73; 2.72).

Finally, when presented the statement that “Courses should be taught as unique and separate bodies of knowledge” (item 8) subjects disagreed (2.26; 2.11). They agreed that “Courses should be taught so students see that the content relates to content in other courses” (item 32: 3.23; 3.22).

Assessment of Learning. Students disagreed with the statement that “Assessing what students have learned occurs almost entirely through testing” (item 2: 1.93; 2.17). They agreed that assessment best occurs through “teacher observations of students at work and through student exhibitions” (item 16: 3.10; 3.00).

Related to the second research question, few practical differences between the groups, general teacher education students and agricultural education students, were found for the constructs under study.

### **Conclusions, Recommendations, Implications**

Understanding the beliefs about teaching and learning held by teachers may provide information in reforming teacher education programs. Competing models for teaching and teacher education exist. Some accepted models are, in large part, historical artifacts, and are based on beliefs about teaching and learning which may no longer prove to be true. Among these are traditional approaches to teaching. New approaches are being developed such as those based on the constructivist theory of learning. This study sought to describe the beliefs about teaching

and learning held by pre-service teachers, specifically their beliefs about component principles associated with the constructivist model of teaching compared with traditional approaches to teaching.

Students in a general pre-service teacher education course (N = 69) and students in a methods of teaching agriculture course (N = 18) served as subjects in this descriptive census study. Thirty-two items represented 16 components which sought to operationalize major constructs of a constructivist model of teaching, and an antithetical statement representing more traditional approaches to teaching.

On some items, subjects' mean ratings indicated that they agreed both with the constructivist method and with the traditional method. While the items on the instrument may be representative of some of the major constructs in constructivist teaching, this may indicate that the instrument is not a good discriminator to force students into agreeing with one or the other. Arranging these statements in a bi-polar format may improve the internal consistency.

Of the three pairs of items representing the construct, "Sources of Content for Teaching" both general teacher education students and agricultural education students rated the constructivist-based statements higher than they did the traditional teaching statements. The construct, "The Goal of Teaching and Learning" had one pair of items, and students from both groups rated the constructivist-based item higher than the traditional. There were four pairs of items for the construct, "How Students Learn." Students rated the constructivist-based choice higher for two of the four pairs. For one pair of items, "students should be instructed in" the subject matter versus "students should inquire into" the subject matter," students in both groups were neutral in their beliefs about both the traditional and the constructivist-based alternatives. On the items, "knowledge should be acquired by" learners vs. "knowledge is created within the minds of learners" students rated both alternatives positive. However, the traditional-based teaching statement was rated higher. "The Role of the Teacher in Teaching and Learning" had four pairs of items. Students in both groups rated the items representing the traditional approach as neutral to negative, while each of the constructivist-based choices was rated positively. "How Teachers Teach" had three items. Students rated two of the three constructivist-based alternatives higher than the traditional match. "Assessment of Learning" had one item, and students in both groups rated the constructivist approach higher than the traditional alternative.

Constructivist approaches to teaching and learning cause the learner to assume responsibility for his/her learning by actively engaging them in the teaching - learning process. The findings in this study indicate that, when traditional approaches to teaching and learning are matched with constructivist-based approaches, students generally prefer the constructivist-based approaches. This should come as little surprise to agricultural educators. Agricultural education historically has been popular to many students because it provides for alternative teaching and learning strategies, when compared with other high school courses, through hands-on application. It is likely that hands-on practice is one avenue which allows students the opportunity to "create" knowledge within their own minds.

This study should be expanded and replicated and these findings should be explored with high school students. If confirmed for secondary school students, teacher education programs should begin to ensure that pre-service teachers are given the educational and experiential background that includes constructivist approaches to teaching and learning.

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# **Beliefs About a Constructivist Model for Teaching Compared with Traditional Teaching Methods Among Teacher Education Students**

## **A Critique**

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### Contribution and Significance of Research

The authors assembled a good review of the literature on which to build the theoretical base for their research. It is hoped that this study could be replicated in other institutional settings, for the findings have significant implications for changes in the ways we prepare teachers to teach and in the expectations that we should have of teachers. For example, in the research reported, the cumulative ratings of the four constructivist statements on the role of the teacher in teaching and learning when compared with the ratings of the four traditional statements on the same topic should send a strong message, both to teacher educators and to teachers, that we should reexamine seriously the examples that we set for ourselves as teachers and what we teach that the role of the teacher should be with respect to teaching and learning. Also, the finding that the respondents rated "knowledge should be acquired by" learners somewhat higher than "knowledge is created within the minds of learners" is not vindication for the traditional "open the head, use funnel, pour knowledge in" crowd, but recognition that both emphases are important in how people learn. In general, the findings should bring satisfaction to the many agricultural educators who use various constructivist approaches in teaching.

### Procedural Considerations

The methodology used in the study was sound. However, this discussant agrees with the authors that replicating the study, but rearranging the statements used in the scales into "... a bi-polar format may improve the internal consistency." If this is done, future researchers may want to consider using a seven or nine-point scale rather than a four-point scale so that respondents come closer to responding along a continuum.

### Questions for Consideration

Does an implication exist that teachers and teacher educators should be made aware of the findings of this study because of the implications that exist as to how students would like to learn? Would it be good procedure to assess the learning styles used and preferred by the respondents and comparing those styles with their responses to "traditional" and "constructivist" items on the instrument used? This question is raised because of the nature of the responses to some items. For example, the respondents did not believe that students should learn "from working primarily alone" but were neutral with the statement that they should learn "from working primarily in groups." Their learning styles could have influenced their responses.