Validation of a Teaching Clarity Scale

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Over the past 20 years, the educational research community has developed a formidable knowledge base to describe the phenomenon of effective teaching. Beginning with the early work of Rosenshine and Furst (1971) and continuing up to and including current day researchers, we have clearly identified an emerging body of knowledge that describes teacher behaviors that make a difference in student achievement.

In the early 1970s, Cruickshank reviewed numerous studies on the subject of teaching clarity. Initial research by Rosenshine and Furst led Cruickshank, Myers and Moenjak (1975) to conclude that clarity was a function of "the beholder"; it was, therefore, logical to ask learners to describe clarity in teaching. Consequently, an open-ended questionnaire which asked learners to recall their most clear teacher and list about five things that teachers did to make learning easier was developed. Additional research by Cruickshank, and the use of factor analysis techniques, eventually resulted in the identification of the following 12 intermediate interference categories of behavior which describe and define clear teaching: (a) providing students with feedback, (b) teaching things in a related step-by-step manner, (c) orienting and preparing students for what is to follow, (d) providing students with roles for satisfactory performance, (e) using a variety of teaching materials, (f) repeating directions and difficult points, (g) demonstrating, (h) providing practice, (i) adjusting teaching to the learner, (j) providing illustrations and examples, (k) communicating clearly, and (l) helping students to organize materials.

Recent research by Hines, Cruickshank and Kennedy (1985) studied the relationships between observed teaching clarity behaviors, student perceptions of teaching clarity, student achievement, and student satisfaction. These researchers found strong positive correlations among several variables. Clear teaching resulted in increased student achievement ($r = .63$) and student satisfaction ($r = .46$). Further, student perceptions of teaching clarity were found to correlate strongly with clarity behaviors exhibited by teachers and recorded by trained observers ($r = .70$). The study concluded that teachers who are perceived by students as teaching with more clarity are more effective in the classroom.

However, in spite of the gains made in the identification of teaching behaviors related to student achievement, very little has been done to develop reliable and valid instrumentation that measures teacher performance over the performance variables. If practical applications of existing research data which suggest means by which teachers can improve classroom teaching are to be made, we must first develop instrumentation that provides valid and reliable baseline data on teacher performance.

The purpose of this paper is to describe a process for establishing the reliability and validity of an instrument for measuring student perceptions of teaching clarity in vocational agriculture teachers. This

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instrument was used as part of a larger study to evaluate the impact of vocational supervision on the teaching performance of beginning teachers of agriculture.

Methodology

Population

State supervisors and university personnel in Illinois, Indiana, Kentucky, New Hampshire, New York, Pennsylvania, Tennessee and Wisconsin were asked to supply the names of teachers in their states with three years or less teaching experience. From this list of 257 teachers, 63 were randomly selected to participate in the study. Each teacher was asked to supply the names of one intact class of students to whom the clarity instrument could be given. A total of 878 vocational agriculture students participated in the study.

Instrumentation

Based upon the 12 categories of intermediate-inferential behaviors developed by Cruickshank et al. (1975), a 21-item instrument (Table 1) was developed to measure student perceptions of the teaching clarity of vocational agriculture teachers. Each of the 21 items was scaled with a 5-point Likert-type scale. Therefore, scores could range from a low of 21 to a high of 105. The instrument was pilot tested with 23 Pennsylvania teachers and 88 students who were attending an FFA leadership training conference. Teachers and students who participated in the pilot study were not involved in the main study. The alpha coefficient calculated on the pilot study data was .85, suggesting that the internal consistency of the instrument was acceptable.

In order to assure that teachers would not bias the results of the test, the researchers requested that the instrument be administered by building principals, vocational directors, or university supervisors. All persons who administered the instrument were provided with a standard set of directions to be read to students prior to completing the instrument. At the completion of the testing, all instruments were collected, sealed in pre-addressed stamped envelopes and returned to the researchers for analysis.

Reliability

Internal consistency is an extremely important component of a scale that proposes to measure a homogeneous behavior such as teaching clarity. If each item in the scale measures the same concept, its overall rating should positively correlate with the total scale scores (i.e., if a teacher is rated as being "very clear," the rating of each item in the scale should reflect that clarity). Items that do not correlate strongly, or correlate negatively, to the total scale scores are poor items and should be removed or rewritten. Cronbach's alpha coefficient is a measure of inter-item consistency, appropriate for use in this situation. The reliability coefficient for the teaching clarity scale was 0.85.

The scale was considered to be acceptable in regard to internal consistency. Two items did not appear to fit the clarity scale quite as well as the other 19 items. Both items were negatively stated, and apparently students misinterpreted them. However, the items did measure specific aspects of clarity identified by Cruickshank and, therefore, were rewritten and left in the scale.

Table 1

Student Questionnaire

DIRECTIONS: Please read each of the following 21 statements very carefully. Then check the appropriate box to the right of each statement as it pertains to your vocational agriculture teacher.

KEY: 1 = my vo ag teacher never does this.
2 = my vo ag teacher does this sometimes but not often.
3 = my vo ag teacher does this about half of the time.
4 = my vo ag teacher does this most of the time.
5 = my vo ag teacher does this all of the time.

EXAMPLE:

0. When I pass my teacher in the hall, he/she will smile and say hello to me.

1	2	3	X	5

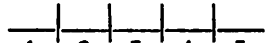
(By checking box 4, you believe your teacher does this most of the time.)

		1	2	3	4	5
1.	Before we start a new unit or lesson in class, our vo ag teacher introduces the lesson with an example we can relate to.					
2.	Once we discuss a unit or lesson in class, our vo ag teacher takes us to the shop (or greenhouse or lab) and lets us practice what we've just learned.					
3.	Our vo ag teacher uses big words in class that I don't understand and he/she does not explain what they mean.					
4.	When we are in the shop (or greennouse or lab), our vo ag teacher will demonstrate what he/she wants us to do before he/she asks us to do it.					
5.	Our vo ag teacher is boring in class.					
6.	When we begin a new unit or lesson, our vo ag teacher will spend ample time explaining what we are going to do and why we are going to do it.					
7.	When we go over new material in class, our vo ag teacher jumps from subject to subject so much that it is hard for me to take notes.					
8.	Our vo ag teacher never tries any new or better teaching methods.					

(table continues)

9. After we finish a unit or lesson and take a test on what we've covered, our vo ag teacher will spend ample time going over the test discussing why the right answers are right and the wrong answers are wrong.

10. When we are studying a subject which is complicated, our vo ag teacher will go over the material too rapidly for me to understand.



11. Our vo ag teacher tells us how we are to be graded in class and we know what is expected of us.

12. When we cover new material in class, our vo ag teacher repeats it several times until he/she is sure it is completely understood.

13. If we do not quite finish a unit or lesson on time, our vo ag teacher will re-adjust our schedule so as to finish the unit or lesson before going on.

14. As we cover material in class, our vo ag teacher will explain something and then give us time to think about what he/she said before moving to the next comment.

15. When we begin an assignment in the shop (or greenhouse or lab) our vo ag teacher first explains the work to be done and asks if we have any questions before we begin.

16. If someone doesn't understand something in class our vo ag teacher will tell the student to get the information from someone else rather than take class time to review it so that the student can understand it better.

17. Before we begin to work on an assignment in class, our vo ag teacher will ask if we know what to do and how to get started.

18. Our vo ag teacher explains things in a way that we can understand them.

19. Our vo ag teacher covers material either too fast or too slow (not at an appropriate pace).

20. When we ask questions in class, our vo ag teacher takes the time to answer thoroughly before moving on.

21. When our vo ag teacher explains difficult things in class, he/she will stress the fact that these things are difficult and tells us why it is important that we learn them.

(table continues)

PLEASE CIRCLE THE APPROPRIATE ANSWER TO EACH OF THE FOLLOWING STATEMENTS ABOUT YOU.

	Please do not write in this space
1. My gender (sex) is: a. male b. female	1. _____
2. I am in the _____ grade. a. 8th b. 9th c. 10th d. 11th e. 12th	2. _____
3. I am taking vocational agriculture because: a. I am interested in agriculture. b. It's an easy grade even though it isn't what I'm interested in.	3. _____
4. How old are you? _____	4. _____

Validity

To establish face validity, the scale was presented to a panel of teacher educators and social statisticians prior to administration. Bailey (1982) suggested that face validity refers to (a) whether the instrument actively measures the behavior the investigators assume it measures, and (b) whether the instrument provides an adequate sample of the behavior. In an effort to strengthen face validity by ruling out alternative criteria students may have been using when completing the instrument, the panel suggested that three hypotheses be tested with regard to what students may have incorrectly perceived as teaching clarity.

Hypothesis 1 theorized that as students completed the instrument, they may consider their perceptions of the total vocational agriculture program instead of their teacher's ability to teach clearly. This hypothesis was tested by comparing the clarity perceptions of first-year students enrolled in vocational agriculture with the clarity perceptions of students who had been in the program two or more years.

Hypothesis 2 theorized that students who had been taught by a different teacher the previous year may perceive teaching clarity for their new teacher differently than those students who had been taught by only the new teacher. In order to test this hypothesis, a single-teacher vocational agriculture department was selected which had recently hired a new teacher and released an unsuccessful teacher from his contract. It was hypothesized that if students exposed to the previous teacher rated the new teacher similarly in clarity to those students who enrolled in the program after the new teacher arrived, validity of the clarity scale would be enhanced.

The third hypothesis suggested that there would be a difference in student perceptions of teacher clarity based on whether students were interested or not interested in vocational agriculture.

Finally, an analysis of variance was performed to determine whether students within each teacher subgroup were rating their teachers similarly. If the instrument was measuring student perceptions of a single concept (teaching clarity), the variance of scores between teachers should be different than the variance of scores within each student group for each teacher.

Findings

Three rival hypotheses were tested in order to strengthen face validity and to rule out alternative criteria that students may have been using when completing the clarity instrument.

Hypothesis 1 considered the possibility that students may evaluate the total vocational agriculture program rather than their teacher's ability to teach clearly. The data in Table 2 suggest there is no evidence to support the belief that first-year vocational agriculture students perceive their teacher to teach more or less clearly than students who have been enrolled in vocational agriculture for two or more years, t (868) = .23, p = .82.

Table 2

Differences in Clarity Scores Given by First-Year Students and Students Enrolled in Vo-Ag for Two or More Years

Group	N	$\bar{x}$	SD	t-value
First-year students	244	79.78	11.26	.23
Upper classmen	646	79.57	12.79	

Note. p = .820; df = 868.

Hypothesis 2 postulated that students taught by a different teacher may perceive teaching clarity differently for their new teacher. Data in Table 3 suggest that students exposed to the teacher released from his contract did not perceive their new teacher's ability to teach clearly any differently than did the students previously enrolled in the program, t (27) = .23, p = .82.

A third hypothesis found a significant difference, t (855) = 7.44, $p<.001$ between the teaching clarity ratings given to teachers by students who were interested in agriculture and those students who said they were taking vocational agriculture because it was an easy grade even though they were not interested in it. Table 4 suggests that students not interested in vocational agriculture rated their teacher's ability to teach clearly, on the average, 11 points lower than those students who were interested in the vocational agriculture program.

Although the scale remained relatively consistent for both groups (alpha 1 = .85; alpha 2 = .82), the data suggest that students not interested in agriculture perceive their teacher's ability to teach with clarity differently than those interested in the vocational agriculture program. The researchers would advise the use of weighted scores to compare data based upon responses of students from these specific populations. The analysis of variance data in Table 5 indicate that there was significantly less variance among student perceptions within teacher groups than between individual teachers, $F(62, 815)$, $p<.001$. This suggests that the instrument was measuring a single concept.

Table 3

Differences in Clarity Scores Given by Students Exposed to a Different Vo-Ag Teacher the Previous Year and Students Not Exposed to a Different Teacher

Group	N	$\bar{x}$	SD	t-value
Students having only the new teacher	19	82.32	12.51	.23
Students having a different teacher the previous year	10	83.40	11.54	

Note. $p = .817$; $df = 27$.

Table 4

Differences in Clarity Scores Given by Students Interested in Agriculture and Those Given by Students Not Interested in Agriculture

Group	N	$\bar{x}$	SD	t-value
Interested in agriculture	790	80.62	11.96	7.44
Not interested in agriculture	67	69.21	13.20	

Note. $p = .817$; $df = 27$.

Conclusions and Discussion

Based on the findings, the teaching clarity scale developed for this study withstood initial tests of reliability and validity. Three rival hypotheses were formulated as plausible explanations of criteria students may have been considering while filling out clarity

Table 5

Summary of Analysis of Variance of Clarity Scores Given to Teachers by Students

Source of Variation	Sum of Squares	df	Mean Square	F
Between teachers	34,008.81	62	548.53	4.44*
Within student groups	100,729.90	815	123.59	
Total	134,738.71	877		

*$p<.001$.

instruments. Two hypotheses were rejected, adding to the face validity of the instrument. One hypothesis showed significant differences in student perceptions of teacher clarity between students who were interested and students who were not interested in vocational agriculture. While no further investigation was undertaken to explain the findings in Hypothesis 3, the authors logically concluded that interested students have more agriculturally oriented backgrounds, and therefore are more inclined to pay attention, complete assignments, and participate in class.

In teaching, self improvement begins with recognition and understanding of a problem at a level on which changes can occur. A teaching clarity scale, specific to vocational agriculture, provides a diagnostic tool which teachers and teacher educators can use to improve teaching by providing specific feedback in problem areas related to clarity. This instrument not only provides a means for evaluating teaching clarity but suggests areas of weaknesses in which change must be made. Teachers involved in this study were not intimidated by the use of the instrument and, in most cases, were eager for the results in anticipation of receiving information which would be helpful to them in improving their classroom instruction.

From a research viewpoint, the validation procedures of this study are necessary when developing any intermediate interference measures of abstract concepts. Social science researchers have an obligation to develop reliable and valid instruments in an effort to assure that their findings can be tested and replicated by other researchers seeking answers to similar questions. The authors recommend that alternative measures of teaching clarity be tested against this scale in an effort to assess criterion related and construct validity. Based entirely upon preliminary data, no instrument should be considered to be completely reliable and valid. Validity data must be developed over a period of years rather than months. In addition to strongly correlating with other measures of teaching clarity, the scale should have discriminant validity, i.e., not correlate with scales proven to measure other traits. Finally, it is recommended that a test-retest correlation coefficient be calculated to determine the scale's ability to repeat its findings over time. Further study using the clarity scale and other

Instruments in a multitrait-multimethod matrix (Anastasi, 1982), could resolve questions of convergent and discriminant validity as well as reliability.

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