

Perceptions of Secondary Agricultural Science Teachers Toward Proposed Changes in Agricultural Curricula in Texas

Richard J. Norris, Assistant Professor
Southern Arkansas University
Gary E. Briers, Associate Professor
Texas A&M University
Accepted for Publication June 1988

Vocational agriculture has witnessed several changes in the industry it serves since the passage of the Smith-Hughes Act in 1917. However, at no time in history has change in agriculture been more rapid than it is now. Agriculture is in the midst of a technological revolution which promises to bring drastic changes. Coupled with technological advancements, economic problems have plagued farmers during the past decade, forcing many to abandon production agriculture. Burton (1986) stated that less than 3% of today's labor force are farmers, but more than 20% of U.S. workers are employed in agriculturally related careers. The production agriculture emphasis of the first half century of vocational agriculture may not be relevant today.

Another challenge facing vocational agriculture has come about as a result of the "back to the basics" movement, epitomized by A Nation at Risk (The National Commission on Excellence in Education, 1983). This report called for stricter graduation requirements emphasizing additional English, mathematics, science, and foreign language studies. School curricula across the nation have been changed to reflect the recommendations of this report.

What does all this mean for vocational agriculture? Students enrolled in the program may have difficulty obtaining a career in production agriculture; instead, they may need to look to agribusiness for employment. Because of the increasing number of required courses for high school graduation, students often must omit vocational agriculture. Enrollment in vocational agriculture nationwide has dropped at an alarming rate during the past decade; from 695,850 in 1975-76, to 525,071 in 1985-86 (National FFA Organization, 1986). Eudy (1986) cited these data as a mandate for changes in vocational agriculture if the program is to survive. The State Board of Education in Texas was critical of vocational agriculture in light of these facts. Ratliff-Reuwer (1987) reported that "an ultimatum was handed down to the Agricultural Education Division of the Texas Education Agency: Either do something to "fix" the program, or it will be done for you" (p. 8).

Agricultural educators in Texas began to restructure Production Agriculture I, II, III, and IV courses (Texas Education Agency, 1968) into semester courses (Texas Education Agency, 1987a), which allow the student to specialize in one area of agriculture or to gain a wide range of experiences. The semester courses de-emphasized production agriculture, while increasing instruction in agribusiness and emerging technologies in agriculture. The major questions were, "How do the instructors, perhaps not directly involved with the change process, view the proposed changes? Do they see the need for change? Are the changes viewed as threatening?"

Change is an aspect of life that all individuals face. Rarely does change from a familiar means of operation occur without resistance and, in some cases, open rebellion. Morgan (1972) stated that an organization needs change when it has displayed one or more of the following characteristics: "(a) ineffective operation; (b) unbalanced growth; (c) obsolescence; (d) inflexibility; (e) vague or conflicting goals; (f) lack of tempo; (g) incapacity for renewal" (pp. 141-146). Morgan also listed what he considered to be four good benefits from an organization's attempt to bring about change. Changes may cause organizations: "(a) to operate more effectively; (b) to achieve balanced growth; (c) to keep up with the times; (d) to be more flexible" (pp. 133-134).

Whenever change is considered, one should ask are there times when resistance to change might be more common, and even predictable? Bennis, Beene, and Chin (1976) identified six instances in which resistance to change could be predicted:

(a) if the nature of the change is not made clear to the people who are going to be influenced by the change, (b) when different people will see different meanings in the proposed change, (c) when those influenced are caught in a jam between strong forces pushing them to make the change and strong forces deterring them [from] making the change, (d) to the degree that the persons influenced by the change have pressure put upon them to make it, and will be decreased to the degree that these same persons are able to have some "say" in the nature or direction of the change, (e) if the change is made on personal grounds rather than impersonal requirements or sanctions, and (f) if the change ignores the already established institutions in the group (pp. 544-546).

When change is needed, it is important to gain acceptance from those affected as quickly and efficiently as possible and to know why a person adopts a change. George and Rutherford (1978) determined that adoption of an innovation could be predicted based on the individual's concerns about it. The more concerned about the change or innovation, the higher the chance that the individual will choose to adopt rather than reject. Pierce (1981) cited age, education level, and support of administration as being major influencing factors affecting a teacher's acceptance or rejection of innovative practices. He found that younger teachers, those with higher levels of education, and those whose administration exhibited support for the innovation were more likely to adopt change and innovations.

The literature suggested, that adoption or rejection of proposed change can be predicted. Is this true for proposed changes in agricultural science curricula in Texas?

Purpose and Objectives

The purpose of the study was to determine if relationships existed between characteristics of agricultural science teachers and of their current programs, and the perceptions of teachers toward proposed changes in agricultural science curricula in Texas. The objectives were:

1. To determine if relationships existed between teacher/program characteristics and teachers' perceptions of proposed curricular changes.
2. To determine if relationships existed among perceived effects of curricular changes, teachers' "free choice" decision to change their programs, and their "actual decision" to change their programs.

Methodology

To accomplish the objectives of this study, an ex post facto research design was employed. This design was used both to describe the present situation and to help in explaining why the situation existed (Borg & Gall, 1983).

Because the study dealt with current changes in curricula of agricultural science programs in Texas, the population for the study consisted of 1,415 secondary teachers of agricultural science in 1987-88 (Texas Education Agency, 1987b). The study was conducted by surveying 933 teachers in attendance at the opening meeting of the State Professional Improvement Conference for Teachers of Agricultural Science, August 12, 1987, Houston, Texas (Krejcie & Morgan, 1970). Responses were anonymous; therefore, it was impossible to survey the non-respondents as they were unidentifiable. This should be recognized as a limitation of the study.

Instrumentation and Data Collection

The questionnaire used for this study consisted of three parts (Norris, 1988). In part one of the questionnaire, teachers responded to 35 statements, indicating the extent to which they agreed or disagreed with each statement. A five-point, Likert-type response scale was employed for measurement purposes (Likert, 1932; Edwards, 1957), with 1 = strongly disagree, 2 = disagree, 3 = neither agree nor disagree, 4 = agree, and 5 = strongly agree. Because survey items were written positively, the scale was interpreted such that an answer of 1 indicated strong negative perceptions and an answer of 5 indicated strong positive perceptions, with 3 being neutral. Twenty-six of the 35 statements suggested possible effects of curricular changes on the program of vocational agriculture. Nine statements elicited the opinions of teachers concerning the methods used to bring about the change. Conceptually, items were grouped into six major "concerns" in agricultural science and one concern dealing with the change process employed. The individual items and scales were developed and validated by four faculty members and six graduate students in the Department of Agricultural Education. Responses to individual items (as grouped conceptually) were summed to develop the seven scales labeled as follows: Perceptions of teachers regarding effects of curricular changes on (a) enrollment in agricultural science, (b) non-vocationally oriented students, (c) FFA, (d) SOEP, (e) program administration, and (f) teacher inservice needs. Perceptions of teachers regarding the methods used to bring about the changes in curricula comprised the seventh scale.

A measure of internal consistency (Cronbach's coefficient alpha) was computed to assess scaling procedures (Cronbach, Gleser, Nanda, & Rajaratnan, 1972; Heimgartner & Foster, 1981). Reliability coefficients for the seven scales ranged from a low of .58 for the program adminis-

tration scale to a high of .86 on the scale concerning the teachers' perceptions toward the change process. It was recognized that the program administration scale was low. However, it was determined conceptually that all items in this scale were measures of one perception related to program administration, and the scale was left as originally constructed.

The second part of the questionnaire was designed to collect data on personal and situational characteristics (e.g., age, sex, degrees held, number of years teaching, size of program). The final portion of the survey instrument consisted of the following two items and response options:

1. If I had MY choice to employ the curriculum which is best suited for my program and community (free choice decision), beyond the 1987-88 school year, I would: (a) continue offering the same curriculum as in the past, (b) adopt the new curriculum on a limited basis, or (c) adopt the new curriculum totally.
2. In my agricultural science program during the 1987-88 school year, I plan to (actual decision): (a) continue offering the same curriculum as in the past, (b) adopt the new curriculum on a limited basis, or (c) adopt the new curriculum totally.

The questionnaire was pilot-tested using a graduate class consisting of agricultural science teachers, vocational supervisors, and teachers from other vocational areas. This activity was used to identify items that might be misleading, to evaluate clarity of the instructions provided, and to determine the time needed to complete the survey by respondents. While the teachers from other vocational areas were not able to complete the survey due to unfamiliarity, they were able to provide valuable input concerning format, readability, and completeness of instructions.

Selected faculty members of the Department of Agricultural Education at Texas A&M University distributed to each teacher as he or she entered the meeting room, a questionnaire, with cover instructions and a pencil. Jay Eudy, Director of Agricultural Education, Texas Education Agency, explained to the teachers the need for answering the questionnaires and that this was one opportunity for them to have input into the change process. Completed questionnaires were collected at the conclusion of the meeting as the teachers left the meeting room.

Analysis of Data

Descriptive statistics were used for reporting characteristics of teachers, characteristics of their programs, and perceptions of teachers toward possible effects of curricular changes on various aspects of their programs. Pearson product-moment correlation, multiple correlation, and point-biserial correlation were used to determine relationships. Cramer's V was calculated to describe the relationship between personal choice to change/not change and actual decision to change/not change (Hays, 1973). Finally, to determine if relationships existed between perceptions, personal choice to change, and actual decision to change, discriminant analysis procedures (with multiple correlation) were employed (Nie, Hull, Jenkins, Steinbrenner, & Bent, 1975; Pedhazur, 1982).

Findings

The "average" agricultural science teacher in the survey is profiled as: (a) being 37 years of age and male, (b) having 12 years of teaching experience, (c) having 9 years of tenure at present high school, (d) being employed in his second teaching position, (e) having 78 students (total) enrolled in agricultural science, (f) having 17 female students enrolled in agricultural science, (g) having had 3.5 years of high school agricultural science, (h) having been an active FFA member for 4 years, (i) holding a master's degree, (j) teaching in a "3A" school (high school enrollment of 285 to 714 students), (k) teaching in a community of 2,500 to 10,000 people, and, (l) teaching in a program emphasizing production agriculture and perhaps agricultural mechanics or cooperative education in agriculture.

Table 1 is used to report teacher perceptions toward effects of the new curriculum on various components of programs of agricultural science. The respondents perceived the effects of the new curriculum to be positive for enrollment, non-vocationally oriented students, and inservice education. They were neutral to slightly positive, concerning effects on the FFA and toward the manner in which the change had been brought about. Teachers expressed negative feelings toward the new curriculum for its effects on SOEP and program administration.

Table 1

Summary of Perceptions of Teachers Toward Effects of the New Curriculum on Various Components of Programs of Agricultural Science

Scale	n	Mean*	SD
Perceived effects of curricular changes on:			
Enrollment	917	3.38	0.68
Non-Vocationally oriented students	914	3.91	0.82
SOEP	903	2.53	0.71
Program administration	906	2.81	0.62
Inservice education	847	3.60	0.60
FFA	855	3.18	0.70
Change process	853	3.19	0.67

Note. 1 = Strongly negative, 2 = Negative, 3 = Neutral, 4 = Positive, and 5 = Strongly positive.

Correlations between personal characteristics of teachers and teacher perceptions toward areas of agricultural science curriculum that may be affected by the proposed changes are reported in Table 2. The perceptions of teachers toward the manner in which the change in the curriculum was made were also examined.

Table 2

Correlation Between Teachers' Personal Characteristics and Perceptions
Toward Curriculum Change

Variable	Age	No of Schools Teach	Yrs of Tenure	Yrs of Vo Ag	Yrs in FFA	Sex	Ed Level Attained
Enrollment	-.09**	-.05*	-.10**	-.08*	-.06*	-.06*	.08** .02
Non-vocational	.03	-.03	.02	-.002	-.03	-.02	-.01 .07*
SOEP	-.09**	-.07*	-.12**	-.13**	.01	.02	.05 -.05
Program admin	-.02	-.02	-.05*	-.05*	-.05*	-.04	.05 -.05
Inservice ed	.05*	-.04	.05*	.09**	-.05	-.05*	.01 .11**
FFA	-.11**	-.08*	-.012**	-.07*	-.04	-.03	.05 -.04
Change process	.02	-.08*	-.01	.03	-.07*	-.05*	.03 -.01

Note. *p < .05 **p < .01.

Although not all correlations were statistically significant at the .05 level, there were some definite trends between teacher characteristics and perceptions.

1. Experience (age, years of teaching, and tenure at present school) was negatively related ($p < .05$) to teacher perceptions of effects on enrollment, SOEP, and FFA. As age, years of teaching, and tenure increased, perceptions became more negative toward the proposed changes. However, a positive relationship existed between "tenure variables" and perceptions toward inservice needs resulting from the change.

2. The number of schools in which the teacher had worked was inversely related to all six scales, with significant negative correlations ($p < .05$) existing for number of schools and the perceptions concerning SOEP, FFA, and the change process. The more schools at which the teacher had taught, the more negative were his/her perceptions toward the curricular changes being proposed.

3. Years spent in vocational agriculture as a student and years spent as an active member of the FFA were negatively related to teacher perceptions. The more time spent as a student in vocational agriculture and as a member of FFA, the more negative were the perceptions of the teacher.

The relationships between level of education and teachers' perceptions of the effects of change were inconclusive. There was little evidence to suggest that the educational level of teachers was a major influencing factor in how teachers perceived the changes in curriculum.

Correlations between program characteristics and teacher perceptions toward areas of the agricultural science curriculum that may be affected by the proposed changes are reported in Table 3. Also, the perceptions of teachers toward the manner in which the change in the curriculum was made were examined. Although not all correlations were statistically significant at the .05 level, one major trend was observed. As increases

occurred in the total number of students and number of females enrolled in the program, and in the size of school and community in which the program was located, the more positive were the teachers' perceptions.

Table 3

Correlation Between Program Characteristics and Teachers' Perceptions Toward Curriculum Change

Variable	No. of Students	No. of Females	Size of School	Size of Community
Enrollment	.14**	.11**	.13**	.11**
Non-vocational	.07*	.07*	.06*	.01
SOEP	.04	.004	.04	.05
Program administration	.07*	.05	.06*	.06*
Inservice education	.06*	.06*	.08**	.07*
FFA	.13**	.13**	.10**	.10**
Change process	.12**	.08*	.11**	.10**

Note. *p < .05 **p < .01.

Teachers were asked to respond to two questions concerning their ultimate adoption or rejection of the new curriculum. The first question concerned what they would do, given their choice, concerning adoption of the new curriculum. Table 4 contains a summary of responses to this question (See column totals).

Table 4

Crosstabulation of Questions Concerning "Free Choice" and "Actual Decision"

Actual Decision	Free Choice			Row total
	1	2	3	
Keep present curriculum	100	155	65	320 (40.8%)
Adopt new curriculum partially	26	249	89	364 (46.4%)
Adopt new curriculum completely	2	11	87	100 (12.8%)
Column Total	128 (16.3%)	415 (52.9%)	241 (30.7%)	784 (100.0%)
Cramer's $V = .40**$				

Note. *1 = Keep present curriculum, 2 = Adopt new curriculum partially, and 3 = Adopt new curriculum completely ** p < .01.

Of the teachers who responded to this question (N = 784), 83.6% stated that, given the choice, they would make some changes in their current programs. These changes would come about by either a partial or complete

adoption of the new curriculum being proposed for Texas, only 16.3% said that they would choose to remain with the same curriculum, if given a choice. This would seem to indicate that teachers in Texas do recognize the need for change in their current programs. Comments by those stating that they would make changes usually cited declining enrollment and out-of-date program emphasis as the major reasons why they would accept the new curriculum. Those who stated that they would "remain the same" felt that the current program was fine and served the needs of their community and students. An "if it ain't broke, don't fix it" attitude prevailed in the comments concerning the choice not to adopt the new curriculum.

The second question concerned what the teachers would actually be doing concerning curriculum for the 1987-88 school year. A summary of responses for that question is also contained in Table 4 (See row totals). Of the teachers responding to this question, over one-half ($N = 464$) of the teachers indicated that they would adopt the new curriculum in part or completely for the 1987-88 school year. The number of teachers whose actual decision to change/not change their program (upper left to lower right diagonal) was in congruence with what they would do given their free choice. On the other hand, other cells (outside the diagonal) show the numbers of teachers, whose decisions were incongruent. A Cramer's V of .40 indicated a moderate relationship between actual decision and free choice decision. Many of the teachers who indicated that they would prefer to change, but were remaining the same for the 1987-88 school year, gave the following reasons: (a) lack of information that new curriculum could be adopted, (b) schedules were already set for upcoming year, or, (c) new curriculum had not been approved officially by the State Board of Education. Those teachers who said that they would not change if given their choice, but who indicated in this question that they were indeed making changes for the 1987-88 school year, cited pressure from their administration to change as the primary reason.

Discriminant analysis was used to determine the relationships between perceptions and the respondents' free choice concerning the new curriculum and between perceptions and their actual decisions about the new curriculum for the 1987-88 school year. Table 5 contains information regarding the relationships between perceptions of teachers and the respondents' free choice to adopt or reject the new curriculum.

The perceptions of individuals toward the change process was the best predictor of their choice to keep the same curriculum, adopt the new curriculum partially, or adopt the new curriculum completely ($R = .59$). Other perceptions that were highly predictive of respondents' choice were: (a) effect on enrollment ($R = .53$), (b) effect on FFA ($R = .50$), (c) effect on program administration ($R = .43$), and (d) effect on SOEP ($R = .38$).

The second question concerned what respondents were actually going to do concerning the new curriculum for the 1987-88 school year. Relationships between perceptions regarding the new curriculum and teachers' actual decisions concerning the curriculum to be employed during the 1987-88 school year were examined. Table 6 contains this information.

As was the case with the question concerning free choice, the best indicator of what the teacher was actually going to do for the 1987-88

school year came from their perceptions of the change process ($R = .34$). Other perceptions which were predictive of the actual decision to remain with the present curriculum, adopt the new curriculum partially, or adopt the new curriculum completely for the 1987-88 school year were those concerning the following: (a) enrollment ($R = .31$), (b) program administration ($R = .25$), (c) FFA ($R = .23$), (d) SOEP ($R = .21$), and, (e) non-vocationally oriented students ($R = .15$).

Table 5
Relationship Between Perceptions of Teachers and Their "Free Choice" Concerning Curriculum

Choice	n	Mean*	SD	Mult. R F Prob.
Effect on Enrollment				
Keep present curriculum	130	2.78	0.79	.53
Adopt new curriculum partially	403	3.37	0.59	<.01
Adopt new curriculum totally	227	3.73	0.54	
Effect on Non-vocational Students				
Keep present curriculum	130	4.00	0.99	.10
Adopt new curriculum partially	403	3.94	0.80	.08
Adopt new curriculum totally	227	3.81	0.81	
Effect on SOEP				
Keep present curriculum	130	2.20	0.74	.38
Adopt new curriculum partially	403	2.46	0.67	<.01
Adopt new curriculum totally	227	2.85	0.69	
Effect on Program Administration				
Keep present curriculum	130	2.45	0.67	.43
Adopt new curriculum partially	403	2.75	0.54	<.01
Adopt new curriculum totally	227	3.11	0.61	
Effect on Inservice Education				
Keep present curriculum	130	3.49	0.75	.11
Adopt new curriculum partially	403	3.63	0.52	.05
Adopt new curriculum totally	227	3.62	0.61	
Effect on FFA				
Keep present curriculum	130	2.62	0.77	.50
Adopt new curriculum partially	403	3.16	0.61	<.01
Adopt new curriculum totally	227	3.53	0.60	
Perceptions Toward Change Process				
Keep present curriculum	130	2.58	0.71	.59
Adopt new curriculum partially	403	3.14	0.57	<.01
Adopt new curriculum totally	227	3.61	0.51	

Note. 1 = Strongly Negative, 2 = Negative, 3 = Neutral, 4 = Positive, and 5 = Strongly Positive.

The size of the school in which the teachers taught, size of community in which the school was located, the number of students in the program, and number of females in the program were factors positively related to teachers' perceptions.

Teacher's perceptions toward the change process (need for the change, manner in which the change was managed, amount of teacher input into the change, etc.) was the single best predictor of the teacher's free choice and actual decision concerning adoption of the change.

Free choice and actual decision were related; however, only a relatively small portion (about 18%) of the variance in actual decision was explained by free choice decision. In other words, factors other than the teachers' own choices were more important in determining their actual decision concerning the 1987-88 curriculum in agricultural science.

Recommendations

Further effort needs to be exerted by staff of the Texas Education Agency to gain support from those teachers that the survey identified as having negative perceptions of the new curriculum. These efforts should attempt to target the following groups: (a) teachers who are more experienced (older, more years of teaching experience, longer period of tenure in present school, or have taught in several different school systems); and, (b) teachers who have programs located in small schools and communities.

Teacher input into the change process should be increased. Many of the teachers who opposed the changes felt there had been little opportunity for teacher input into the new curriculum, and that these changes were being forced on them. The perceptions of the respondents toward the change process, not their perceptions toward effects on the program, were the single best indicator of what their free choice and actual decision concerning the new curriculum would be. That is, those teachers who were more positive about the manner in which the change was implemented were more likely to support the new curriculum, regardless of how they perceived their programs might be affected. Therefore, regardless of the nature of any change being considered, those affected by the change should be included in the planning and implementation of that change.

References

- Bennis, W. G., Beene, K., and Chin, R. (1976). The planning of change (3rd ed.). New York, New York: Holt, Rhinehart, and Wilson.
- Borg, W. R. and Gall, M. D. (1983). Educational Research: An Introduction (4th ed.). New York: Longman Inc.
- Burton, L. D. (1986). Falling in step with the excellence movement. The Agricultural Education Magazine, 58(7), 17-18.
- Cronbach, L. J., Gleser, G. C., Nanda, H. and Rajaratnan, N. (1972). The dependability of behavioral measures - theory of generalizability for scores and profiles, pp. 75-80, 101-109. New York, New York: John Wiley & Sons, Inc.

- Edwards, A. L. (1957). Techniques of attitude scale construction. New York, New York: Appleton - Century - Crofts, Inc.
- Eudy, J. (1986). Ag education: A mandate for change. Texas Future Farmer Magazine, September/October, 4-5.
- George, A. A. and Rutherford, W. L. (1978). Affective and behavioral change in individuals involved in innovation implementation. Paper presented at the Annual Meeting of the American Educational Research Association, Toronto, Ontario.
- Hays, W. L. (1973). Statistics for the social sciences, pp. 743-745. Chicago, Illinois: Holt, Rhinehart and Winston, Inc.
- Heimgarter, D. C. and Foster, R. M. (1981). Perceptions of vocational agricultural instructors regarding knowledge and importance of including selected agricultural mechanics units in the vocational agriculture program. The Journal of the American Association of Teacher Educators in Agriculture, 22(1), 57-61.
- Krejcie, R. V. and Morgan, D. W. (1970). Determining sample size for research activities. Educational and Psychological Measurement, pp. 30, 607-610.
- Likert, R. (1932). A technique for measurement of attitudes. Archives of Psychology, 140.
- Morgan, J. S. (1972). Managing change: The strategies of making change work for you. New York: McGraw-Hill.
- National FFA Organization (1986). Participation in Selected FFA Activities, p. 46. Washington, D.C.: Author.
- Nie, N. H., Hull, C. H., Jenkins, J. G., Steinbrenner, K. and Bent, D. H. (1975). Statistical package for the social sciences (2nd ed.), pp. 9-10, 434-467. New York, New York: McGraw-Hill Book Company.
- Norris, R. J. (1988). Perceptions of secondary agricultural science teachers toward proposed changes in agricultural curricula in Texas. Unpublished doctoral dissertation, Texas A&M University, College Station.
- Pedhazur, E. J. (1982). Multiple regression in behavioral research (2nd ed.), pp. 692-710. New York, New York: CBS College Publishing.
- Pierce, A. J. (1981). Should you be putting innovations into use in your industrial arts facilities? Paper presented at the Annual Conference of the American Vocational Association, Atlanta, Georgia.
- Ratliff-Reuwer, G. (1987). Proposed new curriculum modernizes Texas vocational education system for future agricultural businessmen. Gulf Coast Cattleman, 53(1), 8-9.

(References continued p. 59)

References

- Hawley, D. E., Fletcher, J. D., and Piele, P. K. (1986). Costs, effects, and utility of microcomputer-assisted instruction. Eugene, OR: University of Oregon, College of Education, Center for Advanced Technology in Education.
- Henderson, J. L. (1985, February). Microcomputer use in Illinois vocational agriculture programs. Paper presented at the 39th Annual Central States Research Conference in Agricultural Education, Chicago, IL.
- Krejcie, R. V. and Morgan, D. W. (1970). Determining sample size for research activities. Educational and Psychological Measurement, 30, p. 607-610.
- Lockheed, M. E. and Mandinach, E. B. (1986 May). Trends in educational computing: decreasing interest and the changing focus of instruction, Educational Researcher, p. 21-26.
- Purdue Research Foundation. (1986). Attitudes toward any school subject, by Remmers, H. H., copyright by Purdue Research Foundation, Lafayette, IN (available from name and address).
- U.S. Department of Education, (1986, November). Teachers' view on computer use in elementary and secondary schools, Office of Educational Research and Improvement, Center for Education Statistics.
-
- Norris/Briers (continued from p. 43)
- Texas Education Agency (1968). Basic curriculum for vocational agriculture in Texas production agriculture (3rd draft). Austin, Texas. Texas Education Agency (1987a). Basic curriculums for new semester courses in agricultural science and technology (discussion draft), pp. 1-48. Austin, Texas.
- Texas Education Agency (1987b). 1987-88 Directory, teachers of agricultural science and technology, pp. 1-126, Austin, Texas.
- The National Commission on Excellence in Education. (1983). A nation at risk: The imperative for educational reform. Washington, D.C.: U.S. Government Printing Office.