

Perceptions of Texas Agriscience and Technology Teachers Regarding Influence of Gender in Nontraditional Agricultural Mechanics Programs

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Introduction

Nontraditional vocational and applied technology programs in Texas are defined as programs dominated by over 75 percent enrollment of either sex (Bazen, 1988). Based on 1990-1991 enrollment data, all (10) agricultural mechanics instructional areas were classified as nontraditional due to low percentages--1.17 to 19.20 percent--of female enrollment (Texas Education Agency, 1991).

Female participation in agriculture related activities such as FFA has increased as noted by Herron (1984) and Bazen (1988). However, Johnson (1991) noted that typical contestants in the 1990 Mississippi FFA Agricultural Mechanics Contest were all male. Previously, Cole (1985) stated that agricultural mechanics was the only area of agricultural education where sex equity has not been achieved. Cepica and Quarles (1984) found slight agreement among students that adequate opportunities exist for female students to develop shop skills; they recommended that agriculture teachers should have the same expectation of students, regardless of gender.

Barriers to nontraditional student enrollment and to female vocational teacher employment in nontraditional program areas have been removed by training efforts (Zylanski and Wagner, 1987, Virginia State Department of Education, 1986, and Ellis, 1986). Welter (1981) concluded that tradition is the major obstacle to achievement of sex equity in vocational occupations, and teachers' activities are important in reducing barriers necessary to achieve equity. According to Moore (1978), Texas had five female teachers in 1977-1978 compared to 55 female teachers in 1991-1992, as noted by Texas Education Agency (1991). The noteworthy increase is somewhat diminished by the 1991-1992 census of teachers which indicated that only 55 of 1,404 teachers were female.

Female students in the agriscience and technology program may be negatively influenced by teacher and student bias (Parmley, 1980, Ries and McCracken, 1980, Derryberry, 1979, and Cano, 1990). Opposition by students and by male teachers to female agricultural education teachers has been recorded. The positive but somewhat slow increase of women in nontraditional occupations was put into perspective as Whittington (1990) stated, "Women in agriculture are role models for each other, for aspiring nontraditional agriculturalists, and for nontraditional occupations outside of agriculture." Knight (1980) stressed the importance of role models, prior experience in the occupational area, and teacher attitudes as critical to the development of equity in vocational programs.

Since 1986, Texas teacher education students have been required to take a qualifying examination, "Examination for the Certification of Educators in Texas," better known as ExCET. The secondary vocational agriculture-production agriculture portion of the ExCET was divided into subareas as follows: vocational agriculture

education, animal science, plant and soil science, agricultural mechanics, and agribusiness. Comparable scores for female and male prospective teachers existed in all areas except agricultural mechanics: females averaged approximately 20 points below their male counterparts, 58 compared to 78, respectively. The discrepancy between male and female scores warranted study into the status of both secondary and post-secondary agricultural mechanics programs.

Since agricultural mechanics programs in Texas have been identified as nontraditional based on gender, input regarding teacher preparation program and possible barriers to female student enrollment in secondary programs was needed.

Purposes and Objectives

The major purpose of this study was to determine whether gender affects secondary and post-secondary teacher and student participation in agricultural mechanics programs. Specific objectives of the study were as follows:

Determine instructional preferences of agriscience teachers;

Determine impact of selected activities for providing general mechanical knowledge to agriscience teachers;

Identify program descriptors which may represent limitations to gender equity in agricultural mechanics programs.

Procedures

To accomplish the objectives of the study, 55 female and 1,349 male teachers were identified from the 10 agricultural education areas of Texas. A sample of male teachers was selected using a random selection table: the sample was stratified by selecting two male teachers for each female teacher based on the 10 areas to ensure representation of all areas. Only one teacher per school district was included in the sample. All female teachers were included in the survey.

A survey was developed and field tested by teachers not included in the sample. Returns from two mailings of the surveys were that of 55 female teachers, 42 or 76.4 percent returned surveys, while 92 of 110 males, 83.6 percent returned surveys. The Cronbach alpha analysis established .66 as the reliability of the instrument.

The Mann-Whitney U test for ordinal data was used to evaluate differences between female and male responses (Gravetter and Wallnau, 1988). An alpha of .05 was established prior to analysis of data. Probabilities reported were based on the Mann-Whitney U. However, the Chi square statistic and analysis of variance procedures were used to confirm the analysis, thus the reported means were products of analysis of variance. An open-ended question was included to encourage teachers to comment on recruiting and instructional strategies used to accommodate enrollment of females in agricultural mechanics classes.

Results

Texas agriscience teachers' preferences for instructional areas were summarized in Table 1. Over 40 percent of male teachers preferred to teach agricultural mechanics.

Table 1. Description of Teaching Preferences by Percentages of Male and Female

Preferences	Male Percent (N=92)	Female Percent (N=42)
Prefer to teach agricultural mechanics more than other agriscience courses	40.7	9.5
Prefer to teach other agriscience courses more than agricultural mechanics courses	3.3	52.4
Do not have a preference between agricultural mechanics and other agriscience courses	56.0	38.1
Total	100.0	100.0

and 52.4 percent of the females preferred courses other than agricultural mechanics. A larger portion of male teachers, 56 percent, compared to females, 38.1 percent, did not have a preference between agricultural mechanics and other courses

In Table 2, teachers' activities for acquiring general mechanical knowledge were summarized; three activities were determined to be significantly different when compared by gender. Males' responses indicated more impact on knowledge acquired from industry work experience other than teaching and from full-time or part-time teaching experience. Conversely, females' level of impact on knowledge acquired was greater for college courses for credit when compared to males' responses. Although no significance was noted by gender for home/farm shop activities and enrollment in high school agriscience and technology programs, these factors were generally high impact activities based on the reported means.

Table 2. Impact of Selected Activities for Providing General Mechanical Knowledge to Teachers

Selected activities	Gender*		Z	p
	F	M		
Industry work experience other than teaching experience	2.2	3.1	-2.09	.0364
College courses for credit	3.9	3.1	-3.81	.0001
Student teaching laboratory experience	2.9	2.6	-1.36	.1754
Full-time or part-time teaching experience	3.6	4.0	-1.99	.0471
Research in an educational program	1.6	2.0	-1.39	.1656
University sponsored inservice workshops	2.9	3.0	-0.34	.7350
State improvement conference workshops	2.2	2.6	-1.28	.1997
Continuing or adult education classes	2.1	2.6	-1.17	.2432
Home/farm shop	3.8	4.0	-0.83	.4088
High school agriscience and technology programs (vocational agriculture)	3.5	3.6	-0.21	.8360

*Means for gender are based on 1 having the least impact to 5 having the most impact

Selected program descriptors were analyzed to determine whether differences existed when compared by responses of males and females. As illustrated in Table 3, levels of disagreement by gender were significantly different for seven descriptors.

Table 3. Comparison of Levels of Teacher Agreement with Selected Descriptors of Secondary Agricultural Programs

Selected descriptors	Gender*		Z	p
	F	M		
An advantage exists in teaching agricultural classes consisting of only males	2.0	2.9	-3.64	.0003
An advantage exists in teaching agricultural mechanics classes of only females	1.9	2.5	-3.11	.0019
An advantage exists in teaching agricultural mechanics classes of both genders	4.1	3.2	-4.10	.0001
Females should be recruited to balance the gender ratio in agricultural mechanics classes	2.5	2.4	-0.14	.8857
National and state emphasis on sex equity has made me more aware of instructional needs of students based on gender	2.2	2.6	-2.07	.0387
In agricultural mechanics laboratory, females require more supervision than males	1.8	2.9	-4.48	.0001
Female students participate in laboratory demonstrations	3.8	3.9	-0.17	.8664
Female students experience less stress in agricultural mechanics laboratory if other females are present	3.3	3.7	-2.08	.0372
Female students are graded more leniently than males students in mechanics laboratory assignments	2.3	2.4	-0.59	.5542
Female students are accepted by their male peers in the agricultural mechanics setting	3.2	3.6	-1.91	.0563
Female students do not enroll in mechanically related courses proportionate to enrolling in other agricultural science classes	3.8	3.7	-0.20	.8390
Laboratory dress codes (e.g., long sleeves, long pants, gloves, shop coats) discourage female enrollment in agricultural mechanics classes	2.7	2.6	-0.01	.9959
Manual labor (e.g., lifting and moving heavy objects, perspiring heavily, and working in dirty environments) discourage female enrollment in agricultural mechanics classes	3.2	3.5	-1.17	.2438

*Means for gender are based on 1, strongly disagree to 5, strongly agree.

Table 3 continued.

Selected descriptors	Gender*		Z	p
	F	M		
mechanics classes because they are unfamiliar with basic shop safety, equipment, and tools	2.9	2.8	-0.42	.6718
Male dominated classes discourage female enrollment in agricultural mechanics classes	2.9	2.8	-0.05	.9592
School counselors discourage females from enrolling in agricultural mechanics classes	3.4	3.3	-0.20	.8395
Parents discourage females from enrolling in agricultural mechanics classes	3.4	3.2	-0.77	.4415
The Texas agricultural mechanics curricula adequately serves both males and females	3.7	4.0	-2.34	.0192
A lack of agricultural mechanics industry professions for females after graduation discourages females from enrolling in agricultural mechanics courses	3.5	3.3	-0.61	.5394

Disagreement between teachers concerning desirable ratio of high school male and female enrollment indicated existence of traditional barriers to equitable programs. Female teachers' responses indicated that classes consisting of both genders were more desirable. Male teachers' response levels indicated greater agreement than did females that national and state emphasis on sex equity has created a greater awareness of instructional needs based on gender.

Females more strongly disagreed with males concerning the amount of supervision needed for females compared to male students; females indicated that more supervision should not be needed or required for female students. For an additional descriptor, females experience less stress in agricultural mechanics laboratory if other females are present; males agreed more strongly than did females. Even though both genders rated the Texas agricultural mechanics curricula highly when considering mean responses, males indicated the curricula as more adequate than did females.

Conclusions

Traditional teacher preferences for instructional areas indicate that equity has not been achieved in agricultural mechanics. Identification of females who prefer the agricultural mechanics more than other agriscience courses indicate progress toward equity. College courses have greater impact on the general mechanical knowledge of females when compared to males. Males received greater levels of benefit from industry work experience and from full-time or part-time teaching experience when compared to females.

Traditional beliefs that advantages exist in teaching classes of only males and only females indicate that equity has not been achieved on a statewide basis. Teachers who strive to enroll female and male students on an equitable basis in agricultural mechanics classroom assist the programs to become more equitable and less nontraditional. Progress toward achieving equity in agriscience programs has been influenced by national and state equity programs since male teachers generally acknowledged increased awareness of modifying instructional techniques to serve nontraditional students.

Recommendations

To achieve equity in agricultural mechanics and to initiate change in Texas's agricultural education program, the following opinions are advanced. Female teachers who excel in and are interested in teaching agricultural mechanics need to be identified and publicized as role models for students and other teachers. Activities which enhance general mechanical knowledge should be made more readily available to both sexes. The Texas agricultural mechanics curricula should be subjected to an evaluation by an equitable group of teachers to determine whether improvements can be made. Instructional strategies which will encourage equitable enrollment should be developed and implemented in all agricultural mechanics programs. Increased emphasis on equitable access and participation in agricultural mechanics activities should be implemented in high school and teacher education programs and in teacher workshops.

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