

PERCEPTIONS OF VOCATIONAL AGRICULTURE INSTRUCTORS
REGARDING KNOWLEDGE AND IMPORTANCE OF INCLUDING
SELECTED AGRICULTURAL MECHANICS UNITS IN THE
VOCATIONAL AGRICULTURE PROGRAM

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Agricultural mechanics has been an integral part of the vocational agriculture curriculum since the passage of the Smith-Hughes Act. In the beginning, agricultural mechanics was defined as "farm shopwork," which allowed agricultural students to use school facilities to construct projects or repair equipment that related specifically to their home farm projects.

According to Phipps (1977, p.4), the terminology was changed to "farm mechanics" and was expanded to include new areas of emphasis resulting from increased modernization of farming. Today, the role of agricultural mechanics continues to expand to include skills and knowledge useful in gaining employment in occupations in the broad industry of agriculture.

When determining appropriate content in agricultural mechanics, educators must consider a variety of factors in making curriculum decisions. The type of agriculture located within the state and individual needs of students are primary factors that must be considered. Care must also be taken to maintain technologically current information that represents the latest methods and procedures practiced in the industry.

Purpose

The purpose of this study was to determine the importance of including specific units of instruction in agricultural mechanics as part of the vocational agriculture program as perceived by vocational agriculture instructors in five northwestern states.

The specific objectives of this study were to determine:

1. The amount of instructional time committed to agricultural mechanics in relation to other vocational agriculture instructional areas.
2. Primary sources of preparation in agricultural mechanics for vocational agriculture instructors.
3. The importance of including selected agricultural mechanics areas in the vocational agriculture program.
4. The amount of instructor knowledge relating to instructional areas taught in agricultural mechanics.

Methodology

The population in this study consisted of vocational agriculture instructors from Idaho, Washington, Oregon, Montana, and Utah who were actively involved in teaching agricultural mechanics as a part of an approved secondary vocational agriculture program.

A mailed questionnaire was used to gather data from a sample consisting of 120 instructors from Washington, Oregon, Montana, and Utah and 40 instructors from Idaho, making a total of 160 possible respondents. One hundred and nineteen participants responded for a 74.4 percent return.

A scale of 1 to 9 was used by respondents to record their perceived importance for including specific units in agricultural mechanics as part of the vocational agriculture curriculum. A scale value of "1" was used to indicate no importance, a scale value of "5" was used to indicate average importance, and a scale value of "9" was used to indicate utmost importance.

The respondents were also asked to record the level of knowledge they possessed in the same agricultural mechanics units. A scale of 1 to 9 was used to record perceived knowledge with a scale value of "1" used to indicate insufficient knowledge to teach the unit, a scale value of "5" used to indicate average knowledge of the unit, and a scale value of "9" used to indicate journeyman's knowledge of the unit. The questionnaire was also used to obtain certain demographic data.

Means, standard deviations, and analyses of variance were computed for survey items representing importance ratings for including specific agricultural mechanics units in vocational agriculture, and for survey items representing instructor knowledge of specific agricultural mechanics units. The Scheffé post hoc test was used to reveal differences among respondent groups.

Findings

Respondents were asked to record the percentage of instructional time spent in vocational agriculture areas and the percentage of preparation in agricultural mechanics gained from selected sources.

Table 1 presents the percentage of time spent in vocational agriculture instructional areas by each of the five northwestern states. The instructional area in which respondents devoted the greatest percentage of time was that of agricultural mechanics (39.0%). Idaho instructors spent the largest amount of instructional time (46.4%) in agricultural mechanics while Utah instructors spent the least (28.9%) in the instructional area. An analysis of variance test followed by a Scheffé post hoc test indicated a difference at the .05 level between Idaho and Utah respondents regarding the percentage of time spent in agricultural mechanics.

Table 1

PERCENT OF TIME SPENT IN VOCATIONAL AGRICULTURE
INSTRUCTIONAL AREAS BY STATE

Instructional Area	State					Average F-value	
	ID	WA	OR	UT	MT		
	Mean S.D.	Mean S.D.	Mean S.D.	Mean S.D.	Mean S.D.		
Livestock Production	<u>20.0</u> 12.8	<u>20.4</u> 16.1	<u>23.8</u> 13.7	<u>18.9</u> 9.4	<u>16.6</u> 6.5	<u>20.9</u> 12.3	.72
Crop Production	<u>14.7</u> 11.0	<u>8.0</u> 6.6	<u>12.3</u> 6.8	<u>15.7</u> 8.9	<u>15.9</u> 5.5	<u>13.3</u> 8.8	3.31**
Farm Business Management	<u>7.9</u> 5.7	<u>8.7</u> 6.4	<u>8.6</u> 5.4	<u>10.3</u> 7.9	<u>13.4</u> 8.3	<u>9.5</u> 6.9	2.00
Agricultural Mechanics	<u>46.4</u> 15.8	<u>42.8</u> 28.0	<u>32.3</u> 15.1	<u>28.9</u> 21.8	<u>40.0</u> 13.9	<u>39.0</u> 20.8	3.03*
SOE	<u>6.9</u> 5.4	<u>7.3</u> 7.2	<u>7.3</u> 6.2	<u>12.1</u> 8.1	<u>10.9</u> 9.9	<u>8.8</u> 7.5	2.34
Leadership Training	<u>9.0</u> 5.8	<u>7.3</u> 4.8	<u>10.5</u> 8.2	<u>8.9</u> 6.4	<u>12.8</u> 9.1	<u>9.4</u> 6.8	1.80
Forestry	<u>0.5</u> 1.3	<u>3.7</u> 5.5	<u>4.5</u> 10.4	<u>1.1</u> 2.9	<u>0.5</u> 1.4	<u>1.9</u> 5.1	2.93
Horticulture	<u>0.5</u> 1.3	<u>8.8</u> 15.1	<u>3.7</u> 6.1	<u>4.3</u> 7.3	<u>0.1</u> 0.5	<u>3.5</u> 8.7	4.16

*F probability is less than .05.

**F probability is less than .01.

Significant differences ($p=.01$) were also observed in the percentage of instructional time spent in crop production between Montana instructors (15.9%) and Washington instructors (8.0%) and time spent in horticulture between Washington respondents (8.8%) and Montana respondents (0.1%) as well as between Washington respondents and Idaho respondents (0.5%).

Data in Table 2 reveal the percentage of instructor preparation in agricultural mechanics from selected sources. All respondents, except those from Idaho, gained most of their knowledge from farm backgrounds and experiences. Overall, previous farm backgrounds and experiences accounted for 30.9 percent of the instructors' preparation in agricultural mechanics while college experience accounted for 28.4 percent of their prepara-

Table 2

PERCENT OF PREPARATION IN AGRICULTURAL MECHANICS
FROM SELECTED SOURCES BY STATE

Source of Preparation	State					Average F-value	
	ID	WA	OR	UT	MT		
	Mean S.D.	Mean S.D.	Mean S.D.	Mean S.D.	Mean S.D.		
College Experience in Agricultural Mechanics	<u>33.1</u> 21.1	<u>22.8</u> 17.1	<u>24.3</u> 18.1	<u>32.1</u> 17.8	<u>26.6</u> 18.0	<u>28.4</u> 18.4	1.41
Previous Experience in Agricultural Industry	<u>18.3</u> 15.8	<u>15.8</u> 17.1	<u>27.3</u> 23.3	<u>11.4</u> 10.6	<u>16.6</u> 16.1	<u>17.4</u> 16.9	2.18
Previous Farm Background and Experience	<u>26.2</u> 15.6	<u>28.7</u> 18.3	<u>31.0</u> 19.8	<u>36.1</u> 20.4	<u>35.3</u> 19.9	<u>30.9</u> 18.6	1.21
Previous Experience in High School Vocational Agriculture	<u>11.8</u> 9.9	<u>18.0</u> 17.7	<u>9.3</u> 10.5	<u>10.6</u> 9.0	<u>10.6</u> 14.5	<u>12.4</u> 12.8	1.58

tion. Idaho respondents rated college experience as being their greatest source of preparation (33.1%). Previous experience in industry (17.4%) and previous vocational agriculture training (12.4%) were also observed to contribute to the respondents' preparation in agricultural mechanics.

Another goal of this research was to determine the amount of knowledge possessed by the instructors in selected units of instruction in agricultural mechanics by state. The units of arc welding, oxy-acetylene welding, and small engines were observed to be areas in which all respondents had strong knowledge (7.60, 7.52, and 7.11, respectively). The units of glazing and metal lathe work were units in which instructors had the least amount of knowledge (3.66 and 3.99, respectively) with Idaho and Utah respondents expressing a significant difference in knowledge levels ($p=.01$) in the glazing unit.

Significant differences ($p=.01$) were observed in knowledge of ropework between Idaho instructors (4.07) and Washington instructors (6.17), in cold and sheet metal between Utah instruc-

tors (5.18) and Washington instructors (6.96), and in plumbing between Utah instructors (4.18) and Washington (6.17) and Oregon instructors (6.00). It was further observed that a significant difference at the .05 level existed in knowledge levels in the area of oxy-acetylene welding from respondents in the states of Washington (8.04) and Oregon (7.00) and in the metal lathe area between respondents from the states of Montana (5.06) and Oregon (2.87).

The importance of including selected agricultural mechanics units in vocational agriculture programs by state was also determined. The units regarded as being most important were arc welding (8.22) and oxy-acetylene (8.13). Oregon respondents rated arc welding higher than did other respondents with an importance rating of 8.47. Washington and Idaho respondents rated the oxy-acetylene unit the highest (8.48 and 8.45, respectively) while Utah respondents rated the oxy-acetylene unit the lowest for inclusion in agricultural mechanics curricula (7.41).

Two units receiving the lowest ratings as part of agricultural mechanics curricula were ropework and glazing. Masonry was rated as being below the average importance level (4.93) by all respondents. It was observed that the metal lathe unit also received an overall importance rating of below-average (4.27). Differences were observed in importance ratings of this unit between Washington respondents (5.78) and Oregon respondents (2.80), and Washington respondents (5.87) and Idaho respondents (3.69) at the .01 level. The unit on fencing was found to have significant differences in importance levels ($p=.05$) between respondent ratings from Oregon (6.80) and Idaho (4.90).

Summary and Recommendations

The respondents, as a group, spent more of their time in the instructional area of agricultural mechanics than in other instructional areas. Idaho respondents spent the greatest amount of time in the agricultural mechanics areas while Utah respondents spent the least. State supervisors and teacher educators of agricultural education in the northwest may wish to re-evaluate current curriculum guidelines to determine if instructional time recommendations need to be updated or revised to provide a more balanced program of vocational agriculture.

With preparation in agricultural mechanics from college experience being rated lower than farm background and experience, major colleges and universities of the northwestern states may need to accept more of a role in the teaching of agricultural mechanics skills. This is especially true in light of current trends which indicate that fewer undergraduates possess production agriculture backgrounds.

Even though no correlational tests were conducted, ratings of the amount of knowledge instructors possessed in each unit and their ratings of the importance of including selected units in the agricultural mechanics curriculum appeared to be somewhat related.

The levels of knowledge the instructors possessed were high in the units of arc welding, oxy-acetylene welding, and small engines. This corresponds to the high importance level rating in the same units for inclusion in the agricultural mechanics curricula. The units of glazing and metal lathe work received below-average knowledge ratings and were also identified as being of less-than-average importance in the agricultural mechanics curricula. The variation in knowledge levels that existed among the respondents may be attributed to the types of backgrounds from which they came or from the agricultural mechanics curricula of the institution from which they received their training.

It was observed that respondents in all states rated the units of arc welding, oxy-acetylene welding, tractor maintenance, tools and hardware, construction projects, small engines, farm machinery, carpentry, and electrical wiring as important (7.00 or above) parts of the agricultural mechanics area of vocational agriculture. All five states may need to evaluate the current status of university related preparation presently associated with these instructional units and maintain or provide substantial support of instruction in these areas.

In general, all states regarded the units of masonry, ropework, glazing, and metal lathe work as below-average importance (4.93 or below) as part of the agricultural mechanics curricula. It may be concluded that those units should be eliminated from the agricultural mechanics curriculum or included only when conditions in the local community require such units.

Departments of agricultural education and the land-grant universities in Idaho, Washington, Utah, Montana, and Oregon should review the need for in-service education on topics related to agricultural mechanics in which instructors need additional knowledge.

Additional research should be conducted to gather input from resource people in production agriculture and industry who may further reflect important content areas in agricultural mechanics.

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PROCEDURES FOR ARTICLE SUBMISSION

Philosophy and Content

A statement of the philosophy underlying the publication of *The Journal* was developed by the Editing-Managing Board in New Orleans, Louisiana, in December, 1974. The philosophy is:

The Journal is to promote the profession of teacher education in agriculture by facilitating and expediting communication among members of the profession to the end that results of research, trends, developments, and innovations in teacher education in agriculture are widely shared.

The content of *The Journal* shall be directed primarily to the audience of teacher educators in agriculture, with the following content priorities:

- *Reports of research underway or completed along with implications and recommendations
- *Descriptions and analyses of curriculum and program innovations
- *Philosophical considerations
- *Current trends and issues in agricultural education
- *Theoretical considerations pertaining to research, curricula, and program development activities
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